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# THE IRON AGE

A Review of the Hardware, Iron, Machinery and Metal Trades.

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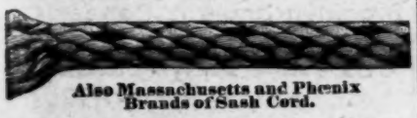

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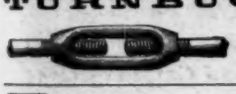

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CAHALL BOILERS See Page 104.

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SMITHSONIAN REPORT

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T. F. WELCH MFG. CO., 65 AUGUSTA STREET, BOSTON.

# THE IRON AGE

THURSDAY, DECEMBER 26, 1901

## Rushing Up a Skyscraper.

To those not familiar with the method of rushing up a modern skyscraper the accompanying engraving will be interesting. Dwellers in the large cities are accustomed to Aladdin like effects in building operations, although constructors have not quite reached the result of a palace completed in a night. Years no longer intervene between the demolishing of an old structure and the occupancy of its more imposing successor. Only a few weeks are now necessary for the establishment of a new landmark and the introduction of a new feature in the sky line. The design of the structure and the method followed in its erection both contribute to advance the date of its rent receiving career.

This order of architecture has been aptly described as a steel frame with a masonry overcoat. The speed at which the metal work can be assembled is only controlled by the delivery of the steel and the hoisting appliances. It is evident that many gangs of men can be worked simultaneously without being crowded so as to interfere with each other. This insures the utmost expedition in the erection of the frame and the completion of the floors but a step behind.

The same may be said to be true of the masonry, which is carried forward in entirely distinct and separate units. One of the best examples we have seen—as illustrating the extent to which this subdivision may be carried—is shown in the engraving, which is from a photograph taken ten days ago. This building is on the southeast corner of Broadway and Maiden lane, New York. It will be noticed that the masonry is carried forward at the same time in three distinct divisions. At present there are first two stories finished, then two stories of the frame; then four stories of masonry, and above this three of steel. The third group of masonry has just been started at the twelfth floor, above which the skeleton is still progressing.

RUSHING UP A SKYSCRAPER.

## Modern Boiler Problems

The following are the conclusions drawn by Col. E. D. Meier in a paper on "Modern Boiler Problems," presented some time since before the New England Cotton Manufacturers' Association:

The exigencies of modern steam practice demand concentration of the power producing plant in minimum space.

The grate area being limited in length by practical conditions, we must utilize every inch of width. With low grade fuels this width becomes the measure of the power which can be produced. Heating surface must be disposed with reference to this width. For this the water tube boiler is most adaptable. Internally fired or underfired shell boilers have not this flexibility of arrangement.

For high pressures, the best, most tenacious and most ductile materials must be used. These are defined in the American Boiler Manufacturers' Association specifications, which cover also the best practice as to constructive details.

Small and mainly cylindrical parts, with all pressures internal, which best withstand the high tension of steam, are now demanded. Large shells present greater structural difficulties and collapsing stresses must be avoided. This again militates against fire tube boilers, where external pressure subjects the tubes to deformation and collapse and where larger units require great diameter of parts, while the water tube boiler meets all these requirements.

Greatest economy requires high furnace temperatures, attainable only where the cooling of the gases by the heating surfaces can be

deferred till the combustion is completed. This excludes internally fired and underfired shell boilers and gives preference to the water tube type.

Rapid steaming requires large and effective liberating surface, presented in almost ideal conditions by the unobstructed and rapidly moving water level of the subhorizontal water tube boiler; vertical boilers of any type are precluded by this consideration.

For cleaning the tube heating surface both inside and outside, *i.e.*, removing both scale and ashes, the water tube boiler, with straight tubes, is immeasurably superior to all fire tube types.

The universal adoption of straight tube subhorizontal water tube boilers by all the navies of the civilized world corroborates the statements above made, and for the same reasons cotton mills will naturally follow in the wake of the electrical and milling industries in adopting these truly modern steam producers.

## Federal Eight-Hour Legislation.

WASHINGTON, D. C., December 24, 1901.—The House Committee on Labor has notified representatives of a number of important industries, including counsel for leading manufacturers of iron and steel, shipbuilders, railroad companies, &c., that the so-called eight-hour bills now pending in Congress will be taken up at a meeting to be held January 9, when a programme of hearings will be adopted preparatory to a report to the House. Chairman Gardner states that the widest latitude will be allowed those who desire to speak for and against the eight-hour propositions, and it is probable that several weeks will elapse before the final vote is taken in committee, as it will not be practicable to devote more than a day or two of each week to the hearings.

Two measures are before the House Committee, one drafted by Chairman Gardner which follows closely the lines of the bill as finally reported to the House in the last Congress, and the other presented by Representative Sulzer of New York, which is understood to have been prepared by certain New York City labor organizations. The Gardner bill in the form in which it has been introduced at the present session by its author consists of but a single section, as follows:

"Be it enacted, &c., that each and every contract hereafter made to which the United States, any Territory, or the District of Columbia is a party, and every such contract made for or in behalf of the United States, or any Territory, or said District, which may require or involve the employment of laborers or mechanics, shall contain a proviso that no laborer or mechanic doing any part of the work contemplated by the contract, in the employ of the contractor or any subcontractor contracting for any part of said work contemplated, shall be required or permitted to work more than eight hours in any one calendar day; and each and every such contract shall stipulate a penalty for each violation of the provision directed by this act of $5 for each laborer or mechanic, for each and every calendar day in which he shall labor more than eight hours; and any officer or person designated as inspector of the work to be performed under any such contract, or to aid in enforcing the fulfillment thereof, shall upon observation or investigation report to the proper officer of the United States, or any Territory, or the District of Columbia, all violations of the provisions of this act directed to be made in each and every such contract, and the amount of the penalties stipulated in any such contract shall be withheld by the officer or person whose duty it shall be to pay the moneys due under such contract, whether the violation of the provisions of such contract is by the contractor, his agents or employees, or any subcontractor, his agents or employees. No person on behalf of the United States, or any Territory, or the District of Columbia, shall rebate or remit any penalty imposed upon any provision or stipulation herein provided for, unless upon a finding which he shall make up and certify that such penalty was imposed by reason of an error in fact.

"Nothing in this act shall apply to contracts for transportation by land or water, nor shall the provisions and stipulations in this act provided for affect so much of any contract as is to be performed by way of transportation, or for such materials as may usually be bought in open market, whether made to conform to particular specifications or not. The proper officer on behalf of the United States, any Territory, or the District of Columbia, may waive the provisions and stipulations in this act provided for as to contracts for military or naval works or supplies during time of war or a time when war is imminent. No penalties shall be exacted for violations of such provisions due to extraordinary emergency caused by fire, flood or danger to life or property. Nothing in this act shall be construed to repeal or modify chapter three hundred and fifty-two of the laws of the Fifty-second Congress, approved August first, eighteen hundred and ninety-two, or as an attempt to abridge the pardoning power of the Executive."

It will be noted that Mr. Gardner has incorporated in his bill a provision intended to head off the opposition of the railroad companies by stipulating that nothing in the act shall apply to contracts for transportation by land or water. This is intended to meet the objections raised by representatives of the Southern Railroad in the last Congress that the law literally construed and enforced would interfere with the carriage of the mails, the movement of troops and with other Government business connected with transportation.

The bill drafted by Representative Sulzer, which will be strongly urged upon the committee, although lacking the support of the American Federation of Labor, is of much broader scope than the Gardner bill, embracing not only work done by contract, but all labor or service of every description except that performed by common carriers, or utilized in the manufacture of "ordinary supplies" of the Government, whether such supplies are purchased in the open market or on contract. The principal provisions of Mr. Sulzer's bill are found in the first two sections, as follows:

"Be it enacted, &c., that the time of service of all laborers, workmen and mechanics employed upon any public works of, or work done for, the United States, or any Territory, or the District of Columbia, whether said work is done by contract or otherwise, is hereby limited and restricted to eight hours in any one calendar day; and it shall be unlawful for any officer of the United States, or of any Territory, or the District of Columbia, or any person acting for on in behalf of the United States, or any Territory, or said District, or any contractor or subcontractor for any part of any public works of, or work done for, the United States, or any Territory, or said District, or any person whose duty it shall be to employ or to direct and control the services of such laborers, workmen, or mechanics, or who has, in fact, the direction or control of the services of such laborers, workmen, or mechanics, to require or permit them, or any of them, except when, in the opinion of the head of the department having the work in charge, an emergency exists, to work more than eight hours in any one calendar day.

"Section. 2. That each and every contract to which the United States, any Territory, or the District of Columbia is a party, and every contract made for or on behalf of the United States, or any Territory, or said District, which contract may involve the employment of laborers, workmen, or mechanics, shall contain a stipulation that no laborer, workman or mechanic in the employ of the contractor or any subcontractor doing or contracting to do any part of the work contemplated by the contract, shall be required or permitted to work more than eight hours in any one calendar day, except when, in the opinion of the head of the department having the work in charge, an emergency exists, and each and every such contract shall stipulate a penalty for each violation of the stipulation directed by this act of ten dollars for each laborer, workman, or mechanic, for each and every calendar day in which he shall labor more than eight hours; and the inspector, or other officer or person whose duty it shall be to see that the provisions of any such contract are complied with, shall report to the proper officer of the United States, or any Territory, or the District of Columbia, all violations of the stipulation in this act provided for in each and every such contract, and the amount of the penalties stipulated in any contract shall be withheld by the officer or person whose duty it shall

be to pay the moneys due under such contract, whether the violations for which said penalties were imposed were by the contractor, his agents, or employees, or any subcontractor, his agents, or employees. No person on behalf of the United States, or any Territory, or the District of Columbia, shall rebate or remit any penalty imposed under any stipulation herein provided for, unless upon a finding which he shall make up and certify that such penalty was imposed by reason of an error of fact."

The representatives of those who are opposed to the eight-hour bill are preparing to assail it not only on its merits, but as a wholly unconstitutional measure, and the point made against it in this respect will be supported by the citation of a decision recently rendered by the Supreme Court of the State of Illinois, with regard to an ordinance of the city of Chicago providing that the successful bidders for the doing of any public work must agree to hire no employees who are not members of labor unions, and must not allow their employees to work more than eight hours per day, upon penalty of forfeiting their contract. The Court, in deciding this case, said:

"It is contended by counsel for appellant in his argument that a provision in the specifications attached to the contract made between the contractor and the city of Chicago for the doing of work upon the improvement in question is illegal, as limiting the number of hours in each working day. The provision thus referred to is as follows: 'In the prosecution of the work under these specifications, eight hours shall constitute a day's labor; and any contractor or contractors who shall compel or allow laborers or employees to work more than eight hours in one day shall be liable to have his contract forfeited, as provided by section 1687 of the Revised Code of the city of Chicago: Provided, however, that in case of emergency the contractor or contractors may, by and with the written consent of the Board of Local Improvements, allow laborers and employees to work extra time.'

"That part of this clause in the specifications which makes the contractor liable for a forfeiture of his contract if he allows laborers or employees to work more than eight hours in one day is unquestionably void and unconstitutional. It infringes upon the freedom of contract, to which every citizen is entitled under the law. It is true that a legislative act which prescribes the length of time amounting to a day's work, when no special agreement upon the subject is made between the parties, is a valid act. But any statute providing that the employer and laborer may not agree with each other as to what time shall constitute a day's work is an invalid act."

It will be noted that the Gardner bill precludes the possibility of an agreement between employers and employees as to the hours of labor to be performed on Government work, and penalizes the contractor who permits his employees to work more than eight hours. The principle involved in this bill is contended by counsel to be identical to that discussed by the Court in the decision above quoted. Among those who will appear against the Gardner bill at the hearings to be granted in January will be Judge J. K. McCammon, representing the Carnegie Steel Company, the Bethlehem Iron Company, the Cramp Shipbuilding Company, &c.; L. E. Payson, representing the Newport News Shipbuilding & Dry Dock Company, the Southern Railroad, &c.; ex-Secretary H. A. Herbert, representing the Midvale Steel Company, the United States Iron Works, the Bath Iron Works, &c. Representatives of other industries will also be heard, as the effect of the bill would be to greatly embarrass Government contractors for army clothing and supplies, shoes, tents, wagons, ambulances, &c. W. L. C.

**The Capital Self Hardening Steel.**—Geo. Nash & Co., 24 South Clinton street, Chicago, have been appointed sales agents for the new Capital self hardening steel, manufactured by the Dannemora Steel Works, Sheffield, England. It is specially intended for heavy work and is suited to roughing at high speeds. It requires no elaborate or special treatment. A tool 1¼ inches square, used in turning mild steel, making a cut ½ inch deep with ⅛ inch feed at a speed of 43 feet per minute, endured seven hours' work and was found in good condition after the test. A similar tool, working on the same material with the same feed and making the same depth of cut at a speed of 56 feet per minute, was also found in good condition after a three-hour run. Other tests of this steel have been made with equally good results. A peculiarity of this steel is that it cannot be overheated or burnt. It is tempered by being brought to a white welding heat and plunged instantly into a cold air blast. The high heat forms a thick scale, and when the steel is put into use it is absolutely necessary that the tool should be thoroughly ground to remove all scale.

## English Interests in the Beaumont Oil Field.

An important transaction is stated to have just been consummated whereby the Roche-Suart Syndicate of London is said to have purchased the Hogg-Swayne property, on which about three-eighths of the producing wells at Beaumont, Texas, are located. The purchase price is stated to have been in the neighborhood of $6,000,000. The crude oil will be carried by pipe line from the Texas fields to Port Arthur, a distance of about 20 miles, where it will be shipped by British tank steamers to various parts of Europe. Eleven steamers, representing a tonnage of 20,000, varying in capacity from 48,000 to 35,000 barrels, will be employed in the service. The first voyage is scheduled to be made from Port Arthur February 19, when a cargo of 35,000 barrels of crude oil will be exported to Cette, Spain, for refining purposes. It is also proposed to send regular consignments to Rouen and Havre, France, also to Middlesbro-on-Tees and London, England.

The Roche-Suart Syndicate has already issued contracts for the construction of storage tanks of large capacity, pipe lines from the oil fields to Port Arthur and for the building of a refinery at that place, which in all will entail an expenditure of nearly $300,000. In the Port Arthur refinery, which will be in operation by February 1 and will have a daily capacity of 6000 barrels, solar oil will be turned out for London gas companies, who intend to utilize it for the purpose of enriching the quality of their gas.

The British concern have already contracted with American shipbuilding concerns for the construction of four barges—two of 15,000 barrels capacity each and the remainder capable of carrying 12,000 barrels of oil. They purpose to utilize the British ocean going steam tug "Stormcock," which is 4000 horse-power.

The extent to which a railroad system of any size absorbs capital is exhibited in a striking way by a statement recently made by the officials of the Atchison, Topeka & Santa Fé Railway Company. Six years ago the reorganization of the property was completed, and in the period which elapsed between July 1, 1896, and January 30, 1901, there was an expenditure of new capital on the system amounting to no less than $36,000,000. Of this amount $15,900,000 was for the construction of new or the acquisition of additional lines, $3,700,000 was for additional equipment, $2,400,000 for terminals and real estate, and the large sum of $14,500,000 was for improvements and betterments. The sources from which the funds in question were supplied were: Sale of general mortgage bonds $18,618,000, with $513,000 from the disposal of miscellaneous property, but $17,600,000 came out of the net earnings of the system itself.

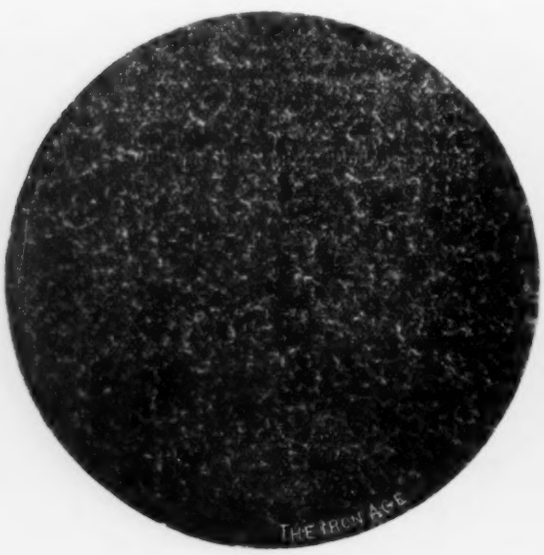
On the London Metal Exchange the failure of William Sargeant & Co. was announced Friday, December 20. The firm were one of the oldest and best known of the London Exchange. It is reported that Mr. Sargeant, who was for many years a well-known metal broker, was long 2000 tons of copper. It is also stated that he was on the wrong side of the tin market, and lost heavily on the decline of Glasgow warrants. The liabilities of the firm are variously estimated at from £30,000 to £60,000. Advices from Glasgow state that the failure caused a decline in Scotch pig iron warrants, which fell to 48 shillings 9 pence cash, from 55 shillings 10½ pence, the quotation at noon of the day previous.

# Rail Rolling at Lower Temperatures During 1901.

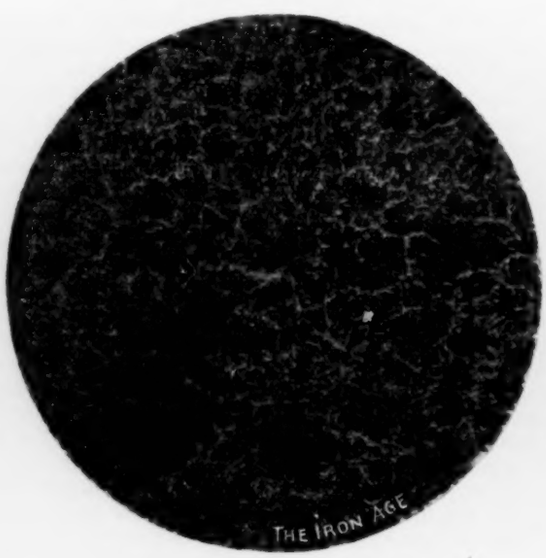
BY S S. MARTIN, SPARROW'S POINT, MD.

For years it has been known that light rails have a very much more nongranular structure than the heavy sections, which is caused by their being finished at a lower temperature. This structure means to the railroad of the mills reheating their blooms find that they must adopt some means of cooling the bar somewhere about the rail rolls, so as to roll at a very much lower temperature. To fully appreciate what low temperatures for rolling may really mean, I will briefly speak of rolling temperatures.

When steel cools from the rolling or finishing temperature there are certain points at which for an instant there is a retardation in the falling of the temperature, and sometimes a perceptible increase of heat. Soft steel,

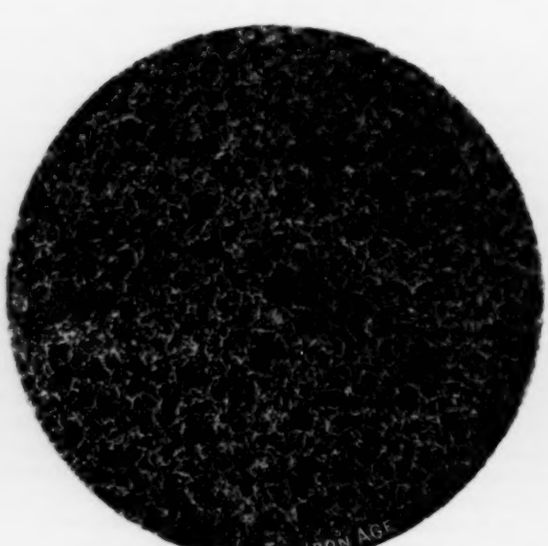



*No. 169.—Edge of Head, ⅛ Inch from Surface, 85-Pound Penna. Section. Rolled from Reheated Bloom.*




*No. 169.—Center of Head, 85-Pound Penna. Section. Rolled from Reheated Bloom.*

*No. 201.—Center of Head, 75-Pound Rail. First Half of Ingot. Rolled as Hot as Possible. Held at Final Pass 1¼ Minutes.*




*No. 201.—⅛ Inch from Surface of Head, 75-Pound Rail. First Half of Ingot.*

MICRO-PHOTOGRAPHS OF RAIL STEEL.

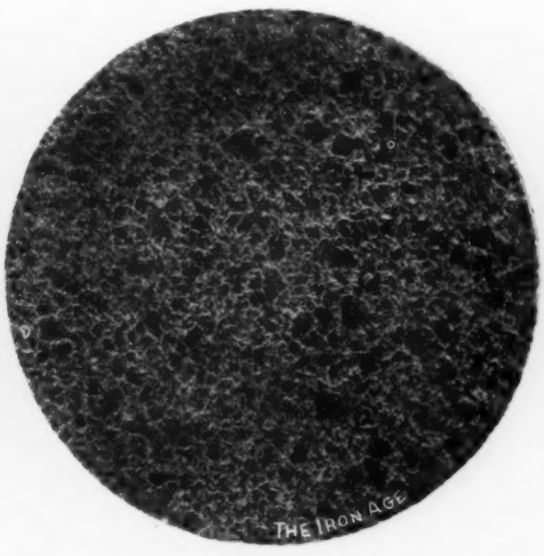
people a better wearing rail! The latter have never developed the reason for it. To people asking the question, "Why did our rails rolled years back wear better?" we can easily answer that since the rails were lighter and since the methods were not improved for great tonnages, a structure was obtained which was nearer to the nongranular. It has only been in the last year that the subject has taken a practical turn in the direction of rolling the heavier sections (say 70 pounds and up) nearer the temperature of the lighter rails. When the railroads made their rails heavier the manufacturers did not meet promptly the necessity of rolling their heavy rails at a lower temperature. Now the manufacturers find themselves pushed to do this, with the result that some say under 0.20 per cent. carbon, has three of these points, while rail steel of 0.50 per cent. carbon has only one. These points are called the "points of recalescence," or, commonly, the "critical points." The structure of steel does not change below this point to any noticeable extent. Steel with 0.20 per cent. carbon or under has three of these points, at 650, 740 and 860 degrees C., while rail steel of, say, 0.45 to 0.55 per cent. carbon has only one critical point, which lies (according to different writers) between 700 and 725 degrees C. The structure of the rail depends for the size of its granules on the rate of cooling to the critical point, and the higher the temperature above the critical point the larger will be the grains. Since no change of structure can result from

finishing below the critical point, we naturally decide that a rail must be rolled as near the critical point as possible to get the best structure, or in the case of rail steel between 700 and 725 degrees C. If the piece of steel in rolling is delayed at any point before finishing it will help the structure directly in proportion to the amount of reduction in the remaining passes, because while the bar is being held (the temperature when starting to hold being about 950 to 1000 degrees C.) the structure is crystallizing, and the higher the temperature the larger the granules to the critical point. For this reason the amount of reduction greatly influences the granular structure, and it should be considerable in order to move the grains to any depth in the bar. The result generally obtained from a number of micro-photographs of this class of finished rails is that the steel is nongranular just as far as the reduction in the last pass thoroughly moves the mass, which for a 5 per cent. reduction will be from ⅛ to ¼ inch; the rest of the distance to the center of the head becomes abruptly more granular from the ⅛ to ¼ inch until the center of the head, which shows the largest granules.

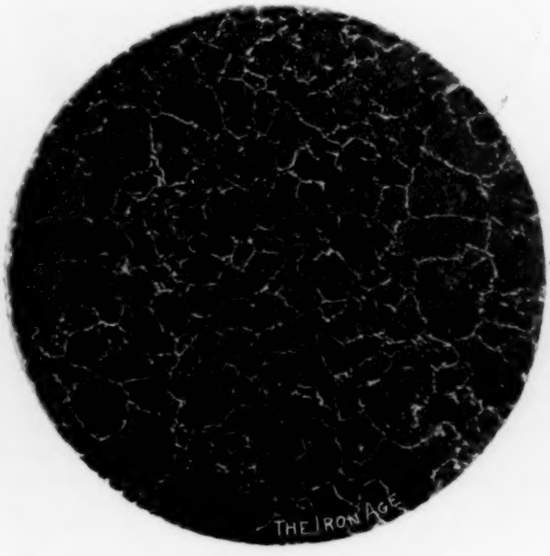
It thus seems that to obtain a nongranular structure throughout the rail the temperature must be reduced earlier in the rolling—in fact, the bar or bloom must not be reheated, but should be rolled direct from the ingot. In the latter case the bloom will be delivered to the rail rolls at a temperature of 850 degrees C., while a reheated bloom will be delivered at 1000 degrees C., or more. I want to emphasize the fact that while the rail is held before the final pass, at a temperature above the critical point, it crystallizes, and the single pass which it subsequently receives is incapable of breaking up the granular structure for more than a certain depth. This practice of direct rolling has been carried on for years in some mills in this country, and in almost all mills abroad. There is no trouble with a granular structure, while the mills rolling reheated blooms have run hard against very granular structure, and thus have this year introduced the method of holding the bar before the last pass. This has greatly improved their structure, but it is not as homogeneous as a structure obtained by direct rolling, as the temperatures are so much above the critical point that the steel becomes granular so easily while being held for the cooling before the final pass.

The microscopic study of rails from these different methods of rolling is interesting, and plainly shows that the bar must be kept at a lower general or average tem-

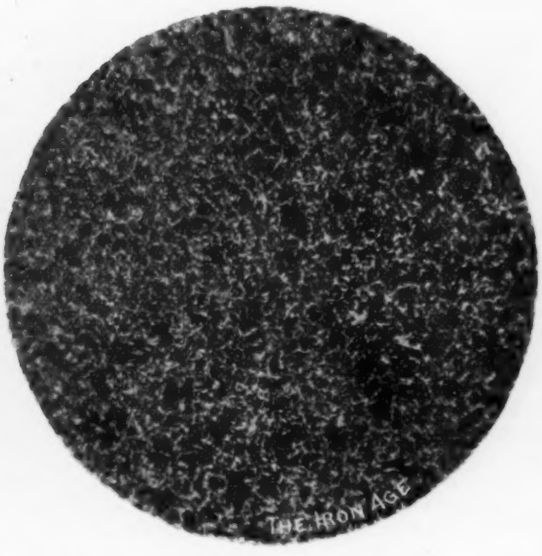
*No. 202.—Center of Head, 75-Pound Rail. Second Half of Ingot.*




*No. 202.—⅛ Inch from Surface of Head, 75-Pound Rail. Second Half of Ingot.*




*No. 207.—From Center of Head, 75-Pound Rail. Treatment Same as 201.*




*No. 207.—⅛ Inch from Surface of Head, 75-Pound Rail. Treatment Same as 201.*

MICRO-PHOTOGRAPHS OF RAIL STEEL.

perature to get the best structure throughout. Usually the method of holding for one and three-quarters to two minutes at 900 to 1000 degrees C. before the bar goes through the finishing pass allows a very granular structure to develop, which the reduction of the last pass of 5 per cent. will not destroy to a greater depth than ⅛ to ¼ inch toward the center of the head, which, as far as temperature is concerned, is far enough above the critical point to do some more crystallizing after the finishing. If not, the granular structure found comes from the first cause explained—*i. e.*, a per cent. of reduction too small to reach the center effectively.

Our microscopists publish occasionally micro-photographs showing the structure obtained by forging at certain known temperatures, measured with the Lechatelier pyrometer. Prof. Albert Sauveur has published such a set showing steel forged at 650, 850 and 1100 degrees C., which, if used as a standard for comparing the structures obtained in rails, gives at once a method of knowing actually what temperature the rail had when cooling after being finished and just how far above the critical point. Without a doubt, the proper way to get at this matter of rolling temperatures is through the microscope. This idea is rapidly gaining ground, and the microscopists deserve great credit for the manner in which they have brought forward the microscope practicably.

I am rather disappointed at the method which the railroad people use to decide what the temperature has been by putting into their specifications a shrinkage clause, in the belief that this will insure a nongranular structure and hence a low rolling temperature. This is not the correct idea, because shrinkage of different steels varies. Then, too, it is so easy to vary shrinkage by holding at the last pass, by running the engine slowly which drives the finishing rolls, and by the application of water both before (which will help the structure) and after (which does not generally have much effect, as steel is near the critical point). Now a nongranular structure of the rail is ideal, although not practicable, but the requirements of the railroads are such that the mills are all striving to outdo one another in getting as low a temperature as possible and also have the head of the rail homogeneous. Microscopic examination will give the true result, something that cannot be influenced by mankind, as shrinkage can.

In conclusion I desire to remind my readers that shrinkage continues under the critical point, and hence does not in the least help or indicate the structure. So it seems that shrinkage is very misleading to the railroad people.

The following micro-photographs explain the above article, and were obtained in the following manner:

No. 201 was the first half of an ingot rolled as hot as possible through the ten passes of the rail rolls to the final pass and there held 1¾ minutes; then through the finishing pass.

No. 202 was the other half of the same ingot, held before going into the rail rolls for two minutes; then sent through the 11 passes at this reduced temperature.

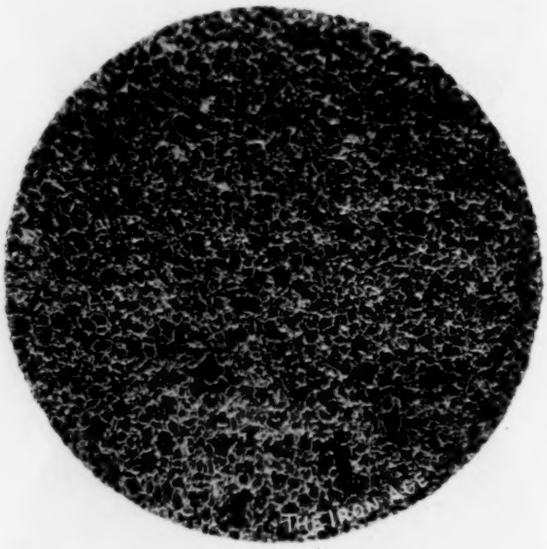
No. 207 was treated the same as No. 201.

No. 208 was treated the same as No. 202.

No. 169 was rolled from a reheated bloom, and sent through the mill extremely hot up to the last pass and there held two minutes. This rail had a shrinkage in 30 feet of 5½ inches, but shows a structure that is not homogeneous, while a direct rolled rail will give a structure similar to Nos. 202 and 208, and still on account of no special manipulation will have shrinkage of but from 5⅞ to 6 inches.

The magnification throughout was 50 diameters.

*No. 208.—Center of Head, 75-Pound Rail. Direct Rolled Rail.*




*No. 208.—⅛ Inch from Surface of Head, 75-Pound Rail. Direct Rolled Rail.*

MICRO-PHOTOGRAPHS OF RAIL STEEL.

**The H. W. Johns-Manville Company.**—The H. W. Johns Mfg. Company of New York and the Manville Covering Company of Milwaukee, each company having been closely identified as handling the goods manufactured by the other, have consolidated their interests. This consolidation is to take effect January 1. The new company, whose capital stock will be $3,000,000, will be known as the H. W. Johns-Manville Company. The officers of the new company will be: T. F. Manville, president; C. B. Manville, vice-president; George W. Gladwin, vice-president; F. R. Boocock, treasurer, and H. E. Manville, secretary. James G. Cannon will be chairman of the Board of Directors. C. R. Manville will be manager of the Western Department, and he, with C. B. Manville, will remain in Milwaukee. T. F. Manville and H. E. Manville will remove to New York. The new company are rapidly completing a plant at Milwaukee for the manufacture of carbonate of magnesia and mineral wool. When this plant is completed the company will be prepared to furnish a most complete line of all grades of steam pipe and boiler coverings and asbestos goods of all descriptions.

The Neptune Meter Company of New York have been awarded a contract for the city of Cleveland involving 6000 water meters, with an option of 5000 more. The contract includes 5000 ⅝-inch meters, including connections and cast iron frost bottom, at $6.75 each; 800 ¾-inch meters, at $9.45; 200 1-inch, at $13.50.

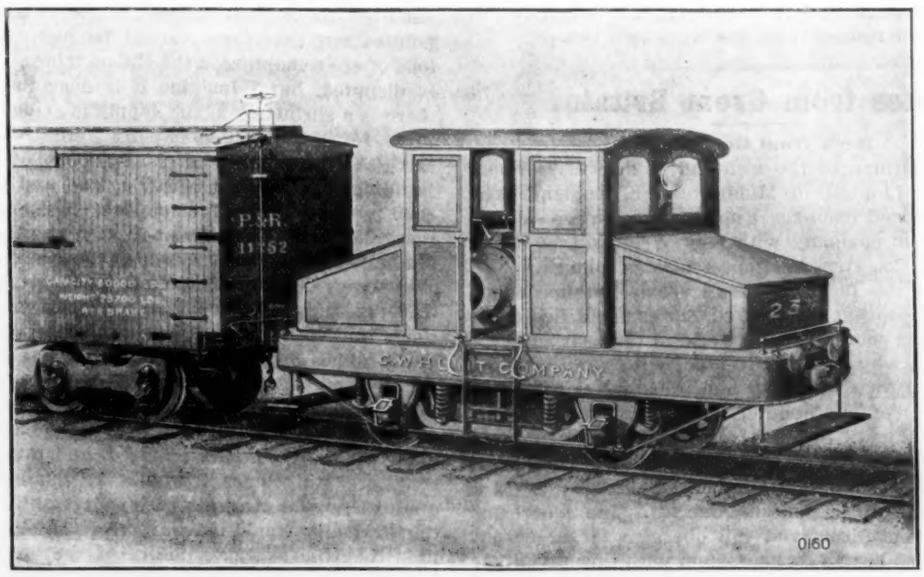
## The Hunt Electric Locomotives.

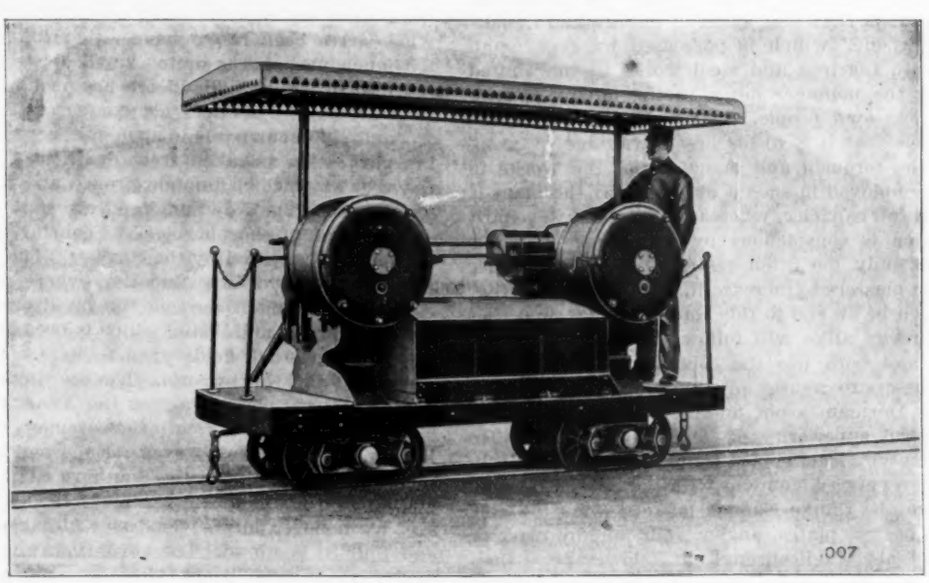
The C. W. Hunt Company of West New Brighton, N. Y., have for many years been manufacturing a complete system of industrial railways; their standard gauge being 21½ inches. This system is in general use in many large works, both in this country and abroad. The various types of cars manufactured by them for transporting different kinds of materials are probably familiar to many of our readers. It may not be so generally known, however, that the company also manufacture storage battery electric locomotives for hauling these cars. These locomotives are carried on two swiveled eight-wheel trucks, with every wheel a driver, thus enabling the locomotive to ascend moderate grades. The energy is furnished from a storage battery which is recharged at night or at intervals during the day, when the locomotive is not in demand. Two independent electric motors are used, either in series, or in multiple, depending upon the speed and torque required.

A difference of level in the floors of workshops is a fruitful source of expense when articles are moved by hand. This disadvantage disappears with the locomotive, as it will easily carry its load up moderate grades, and, as it runs with perfect freedom around curves of 12 feet radius, there is no difficulty in reaching any part of the works.

The motors are not mounted between the wheels, in accordance with the usual street railway practice, because the space is extremely small, and if the motors were so mounted the room below the platform would be filled with motors, gears and connections, so that it would be difficult to inspect the various parts. It would also bring the motors and gears so close to the track that the machinery could not be protected from dust or mud. The gear wheels have machine cut teeth, and are mounted on steel shafts, ground true on dead centers, and run in bearings with removable bushings. All the gearing, shafts and bearings are inclosed in an oil tight circular case.

For the class of service required of these locomotives, their operation by storage battery is a decided advantage over electric locomotives to which the electric energy is supplied by trolley wires. In almost every case, the first cost of the battery is less than the cost of the wires, including the expense of erecting them in position, and the maintenance is far less than for trolley wires. The battery locomotive can instantly run on any track, regular or improvised, while the trolley locomotive can run only where wires are installed. Trolley wires cannot conveniently be run in erecting shops, machine shops or under overhead crane, while the battery locomotive is efficient wherever a track is laid. Electric locomotives operated by trolley are also an element of danger on ac-




THE HUNT ELECTRIC LOCOMOTIVES.

count of the sparking at the contacts, this being particularly true where there are many switches, cross overs and curves. With the storage battery locomotive, however, there are no troublesome overhead wires and no return current to pass from wheel to track. The fire risk is therefore reduced and correspondingly favorable insurance rates are obtainable. Of course, these locomotives are not recommended for long hauls or long and severe grades, but they are particularly suitable for use in yards or intermittent work. If the locomotive is not at work no power is used or wasted, and, if it is at work, only the power needed to do the work is taken.

## Notes from Great Britain.

### Back from the States.

Charles Dorman of the well-known firm of Dorman, Long & Co., Limited, of Middlesbrough, England, who has just returned from the United States, where he has made a tour in company with Guy Wrightson of Head, Wrightson & Co., gives his impressions as follows: "Notwithstanding the fact that there seems nothing which can possibly prevent the United States from being the steel producing country of the world in the near future, I see no reason why we in Cleveland, with our cheap pig iron (for surely with uor coal and ironstone within such short distance of one another, and with our blast furnaces at the mouth of the river Tees, we can put pig iron f.o.b. as cheaply as the Americans can ever hope to do, should not be able to produce steel for export at a less price than can be done in America. The Americans have a purer pig iron, and can obtain a larger output from their open hearth furnaces, and with this advantage the difference in cost between their pig iron and the steel ingot is bound to be less than in our case; but their works are many miles from the seaboard, so that the railway rates they have to pay should more than neutralize the advantage they have over us in their purer pig iron. This is as far as the manufacture of steel ingots is concerned: in other respects, they have no advantage over us. Their steel works, rolling mills, bridge building works, &c., are certainly magnificent and complete in every way, with up to date labor saving machinery, but if we choose to spend the money we can have similar works in Cleveland. What we want is that that spirit of energy and 'push' and 'never-say-die,' which is possessed by every man connected with the iron and steel works in the United States, from the manager down to the laborer, be instilled into our own people. In the United States the workman feels that it is to his best advantage to co-operate with the foremen and managers of the works in which he is employed in such a manner that the plant is worked to its full capacity, whereas in England this spirit of co-operation is conspicuous by its absence and the mens' unions only too often restrict the output rather than help the masters to increase it. But I feel sure that there will soon be an end to this state of things, and that men and masters alike will follow the example of the Americans, and both use the common sense they undoubtedly possess to greater advantage." It will be seen that Charles Dorman is not unduly depressed with the present marked superiority of American methods. He sees no reason why Englishmen should not put down rolling mills in every way identical with the American, and if this is done, he thinks English makers would be able to put steel beams, plates, angles, rails, or any class of rolled steel, f.o.b. Middlesbrough, at a lower price than the Americans. His opinion should be worth something, for he is connected with one of the most successful trading concerns in the north of England. The report has been issued, and the annual meeting held, of Dorman, Long & Co., Limited. From this I observe that the profit for the year is close upon $600,000, 8½ per cent. being distributed in dividend upon common stock. It is worth noting that last year this firm paid 15 per cent., and many shareholders were expecting that as the profits were about the same, so also would be the dividend. The chairman of the company, however, is of opinion that as there has been a heavy fall in prices without a corresponding reduction in cost, it is wise to pay a very conservative dividend.

### Shortage of Iron Ore.

The marked prosperity of the last few years has tended to hide the serious economic condition of the iron trade of this country. During the past few years I have several times drawn attention in these columns to the growing menace confronting the trade in the shortage of high grade ores. Some manufacturers have put off the evil day in the optimistic thought that probably new processes would be discovered whereby low grades ores could be improved in value. Nothing has come of this, not even the Edison scheme. Last October the *Statist* pointed out that there cannot be more than 15,000,000 tons of ore remaining in the Bilbao mines. This is strongly disputed, but I imagine it is near the truth. That there is a shrinkage in the supply is evidenced by the returns, for in 1899 Bilbao exports were 5,500,000 tons, and this year they will be slightly under 4,500,000, notwithstanding the fact that both England and Germany have been pressing keenly for supplies. The *Statist* went further, and pointed out that not only was there a growing diminution in quantity, but also that the average quality also shows decline. The explanation given of the word "average" is as follows: "In former days, when only the richer ores were shipped and low grades were simply left in the mines or tumbled over into waste heaps, 'rubio' ore used regularly to analyze here about 52 per cent. or not much below it. But as the good ore has been reduced in quantity inferior ores have been shipped to make up the quantities required, and thus while 52 per cent. ore still comes it comes in smaller and smaller quantities, while cargoes of low test stuff are now sent that formerly would not have received ship room. Thus it is that the average quality of the ore shipped from Bilbao has greatly deteriorated." If these facts be true, it necessarily follows that unless some new ore fields are discovered it cannot be many years before the iron trade of this country and of Germany will be in a parlous condition, or certainly it will be placed at a serious disadvantage with American competition. Spain is said to possess other ore fields, but up to now nothing definite is known, and many attempts at opening up ore fields in the south of Spain have proved a failure. The Seville district has some fairly rich deposits, but they are in the hands of three Scotch firms of ironmasters who retain the output entirely for their own furnaces. Other ores which have been tested have either too much silica or too much phosphorus or too small a porportion of iron. A cargo of Newfoundland ore has just been discharged at Ardrossan. This does not compare with the Spanish ore, and comment is made upon the fact that ore for mixing purposes was taken from Spain to Cape Breton by the very ship which brought from Cape Breton pig iron to Glasgow. The Newfoundland ore contains more than 0.02 per cent. of phosphorus. The conclusion of the whole matter is thus stated by the *Statist:* "The point, then, is this—that next to Lake Superior (where, by the way, it is said that signs of the end can be discerned), which is too far from us, and Spain, which is becoming exhausted, the only ironstone fields open to us are those of Newfoundland and Nova Scotia. The ore there is cheap, and can be brought cheaply across the Atlantic, but it is not adapted for the making of Bessemer iron. At Cape Breton it is about to be used for the making of steel by the basic process, as in the Southern States of America, and, to a large extent, in Germany. In this country there are, we believe, only seven basic furnaces in Cleveland and four in Scotland. The revolution in the British industry, then, must begin with the construction of basic furnaces for the utilization of the phosphoric ores that soon will be all that is available. But that will not suffice to preserve our steel making industry until we merge smelting and steel making in one continuous and economical process."

### Municipal Foreign Contracts.

At a recent meeting of the Salford Town Council it was stated that the Leeds Steel Works had sent in a tender at £7 per ton for 850 tons of steel rails. At the same time a Belgian tender was offered at £6 per ton. The committee ordered 200 tons for immediate delivery from Leeds and 600 tons from the Belgian firm, as the latter could not supply within less than eight weeks. A

motion was made that the lowest tender of the English firms should be accepted, but the recommendation of the Tramways Committee was approved. On the same day, at a meeting of the Manchester City Council, objection was raised to a recommendation that the council should give a contract to the value of £113,000 for electrical plant to the Electrical Company, Limited, Germany. It was stated that if the contract were given to an English firm there would be a difference of no less than £36,000. The British Westinghouse Company's tender was £16,000 more than the German. It was pointed out that this would have to be made in America, as the British Westinghouse Company's factory in Manchester would not be ready until next July.

**Some Open Contracts.**

There are quite a number of open contracts for water pipes and bridges. Thus, in connection with the Bakewell Water Scheme, cast iron pipes will be required in building a reservoir to hold 115,000 gallons. For the laying and jointing of the southern section of the second line of pipes, from Thirlmere to Manchester, the tenders should be sent to the German Water Works Committee, Water Works Offices, Town Hall, Manchester, by January 7. The works extend to about 14 miles of cast iron pipes 44 inches diameter, 10 miles of 40 inches diameter, and ¾ mile of steel pipes at various points upon the line of works. The contract includes the fixing of the valves and iron work, the enlargement of existing wells, and other work connected with the second line of pipes. Pumping machinery is required at Rochford, Essex. The contract is for the making, erecting, setting to work and maintaining in good order for six months two oil engines, two sets of 3-throw deep well pumps fitted with Ashley's patent buckets, two sets of horizontal 3-throw plunger pumps for high service, and all necessary gearing, pipes, valves and other fittings for the Rochford Rural District Council. Each set of deep well pumps is to be capable of raising 16.32 cubic feet of water per minute to a total hight of 235 feet, including friction, and each set of high service pumps is to be capable of raising 16 cubic feet of water per minute to a total hight of 358 feet, including friction. Tenders must reach Frederick Gregson, clerk of the District Council, Southend-on-Sea, on January 6. Another little contract is for re-erecting the Crown Bridge, near Griffithstown, South Wales. Tenders must reach the clerk of the Panteg Urban District Council, Club Chambers, Pontypool, on January 10. The Norwegian State Railways ask for tenders for the supply of water pipes as follows: 200 miles of 5-inch, 100 miles of 4-inch and 1700 miles of 3-inch cast iron socket pipes, turned, bored and dipped, besides irregular fittings, stop valves, taps, &c. The Norwegian Government gives a preference of 15 per cent. to native tenders. All tenders must reach the Norwegian State Railways at Christiania not later than January 20. From the foregoing contracts, which constitute only one hundredth part of those already published, it will be seen how large a part is now being played in the use of cast iron pipes by the various governing authorities in England. Reservoirs are now being built in every part of this kingdom, and consequently the demand for pipes is likely to increase rather than decrease.

**A Little Lesson in Reciprocity.**

M. Francis Laur, a mining engineer and a former Deputy, has addressed a petition to the French Senate, in which he calls attention to the American Steel Trust, with its capital of 4,500,000,000,000 of francs, and its possible effect upon the European market. M. Laur points out that steamers have been constructed for the purpose of bringing steel direct from the Great Lake district of America to English and German ports, and that numerous cargoes of 3000 to 4000 tons have already been shipped. France is menaced by the trust as well as England and Germany, and with a view to protecting French industry the petitioner suggests that there should be a modification in the French customs duties, following the example of Russia. M. Laur states that there is a great difference between the French and American tariffs. For instance, American machine tools, upon their importation into France, pay a duty of: For machines weighing 250 kilos and less, 70 francs the 100 kilos; for machines weighing from 250 to 1000 kilos, 20 francs the 100 kilos, and for machines weighing 1000 kilos and above, 15 francs the 100 kilos. These rates represent 10 per cent. ad valorem, while French machinery and other metal goods pay upon importation into the United States an ad valorem duty of 45 per cent. The committee to which this petition was referred report favorably upon the arguments set forth by M. Laur and propose to refer the same to the President of the Council for submission to the Minister of Commerce, in order that he may consider in what way the French metallurgical and machinery industries may be protected.

**The Lesson of the German Trade Depression.**

There is a great deal to be learned from the German trade depression, an analysis of which I recently sent you. It is earnestly to be hoped that beyond the similarity of exceptional trade prosperity at a given period no further resemblance will be observed between America and Germany. The first sign of the German collapse was a decreasing demand in the most necessary iron products, and it soon became evident that merchants who had bought enormous lines of iron and steel on speculation were bound to encounter misfortunes of all kinds. The heavy purchases of the merchants of course complicated the situation all around, for the rolling mills and makers of partly finished and finished iron found themselves in keen competition with the merchants, not only to obtain what few orders were going, but also in the direction of cutting prices right and left. Thus the rolling mill syndicates who had fixed the price of rolled iron at 210 marks per ton came down in price in rapid stages to 120 marks. Even then they failed to attract home consumers. To make matters worse, the pig iron, coal and coke syndicates of Westphalia refused positively to listen to any suggestion that they should, under the circumstances so suddenly arisen, reduce prices on current contracts. And now comes one of the astounding facts of the crisis. Both merchants and manufacturers were so wildly confident that they were merely beginning their trade boom that they had given out and made contracts for one and two years in advance of their requirements, at the highest market prices. It is true that the syndicates refused to sell for short periods, but that only emphasizes the general incompetence of the buyers who should have met combination with combination. Thus with demand gone they were compelled to fulfill their engagements with the syndicates to take delivery of and pay for the raw materials at famine prices. On the top of all this came the excesses committed by the promoting and financial gangs. The futurity did not even stop here, for the banks were hypnotized by the financiers and fell an easy prey to the temptation to exploit the general investor. The electrical industry has been the greatest sufferer. Not only were the old, well-known electric companies enlarged time and time again, but a whole bunch of mushroom undertakings grew up in the night like Jonah's gourd. Naturally severe competition followed. One way of keeping things going was by converting the tramways from horse into electric motion. The Stock Exchange began to bid wildly for the control of this, that and the other electrical company; prices were run up to such a point that the winners found that they had paid far too much for the concerns they sought to control, and so things came down with a clatter. Further, the electrical companies could not confine themselves to their own function, but became financiers for tramways and similar undertakings. The last straw to break the back of the market was the downfall of the Leipziger Bank. The news of this came like a thunderbolt, and from excessive buoyancy everybody was plunged into unprecedented gloom. Those who have concerned themselves with large combines which control their special industry from the raw material to the finished article will be interested to read that no iron works which were using other than their own raw material were able to continue the distribution of dividends; companies which in the previous year had paid 20 per cent. had to suspend all payments. And now for the future. A writer

who is well acquainted with the situation says: "Slow, very slow, and painful will be the recovery to a healthy state of business; the wounds opened by the crisis in every direction are too deep and serious to admit of rapid healing. But this healing process has undoubtedly begun; there are unmistakable signs of successful resistance to the effects of the disaster. It is, for instance, a hopeful indication that the iron and steel trades have resolutely put their hand to the plow to extricate themselves from the slough of despond in trying to make good the falling off in the home trade by increasing exports. And the change for the better in the American steel industry has most opportunely afforded a means to the desired end. For in America the depression which really was the primary cause of the German breakdown has entirely disappeared, so much so that the German iron and steel works can now look to the United States as a buyer of their surplus output. It has, for instance, not long ago become possible for their mills to deliver iron as far as west of Pittsburgh, right into the heart of the American iron industry, at prices, it must be admitted, which excluded any benefit remaining for the German seller. But this production at prices leaving no profit, and in many instances a loss, is really the characteristic of the present economic position of the chief German industry, the manufacture of iron and steel and of all the industrial undertakings affiliated with it." Of course this sudden contraction of the German market has adversely affected Great Britain, for Germany is our best customer. On the other hand, Great Britain is America's best customer, and so unless strong action is taken, both in Great Britain and America, in the immediate future we shall find this trade depression moving round in a vicious circle.

### A Big Contract Secured.

The India Rubber, Gutta Percha & Telegraph Works Company, whose works are at Silvertown, London, have secured the contract for the large Pacific cable which is about to be put down. This ends the various rumors which have been going round for some time past.

### American Iron and Steel in England.

From the two subjoined tables it will be seen that there i sonce more a slight tendency toward shipping American iron and steel over here. It will be observed that the shipments of pig iron from America to England during the month of November were the highest for seven months, and of unwrought steel the highest for five months. It does not amount to much, however, as will be observed by looking at the totals for the three previous years, 1900, 1899 and 1898:

*I.—Pig Iron.*

| | 1900. Tons. | 1901. Tons. |
|---|---|---|
| January | 5,742 | 12,847 |
| February | 2,356 | 8,766 |
| March | 4,688 | 2,910 |
| April | 1,853 | 788 |
| May | 1,629 | 1,510 |
| June | 4,829 | 346 |
| July | 3,121 | 319 |
| August | 7,282 | 801 |
| September | 8,829 | 355 |
| October | 11,041 | 1,261 |
| November | 28,759 | 2,374 |

| | Tons. | |
|---|---|---|
| Year 1900 | 94,282 | £350,649 |
| Year 1899 | 80,988 | 219,715 |
| Year 1898 | 76,356 | 180,614 |

*II.—Unwrought Steel.*

| | Tons. 1900. | Tons. 1901. |
|---|---|---|
| January | 409 | 16,647 |
| February | 369 | 16,405 |
| March | 585 | 5,804 |
| April | 2,632 | 5,275 |
| May | 2,190 | 3,247 |
| June | 14,988 | 412 |
| July | 10,200 | 65 |
| August | 11,883 | 605 |
| September | 21,538 | 238 |
| October | 31,217 | 572 |
| November | 32,643 | 1,050 |

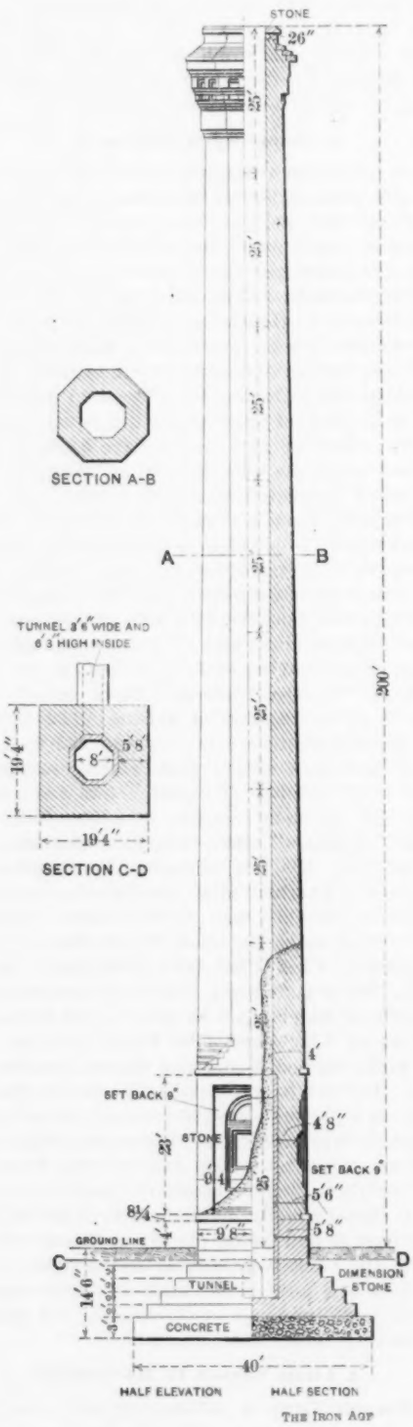
| | Tons. | |
|---|---|---|
| Year 1900 | 157,628 | £1,011,851 |
| Year 1899 | 59,375 | 288,706 |
| Year 1898 | 29,374 | 158,689 |

S. G. H.

## A Chimney Failure.

The following article, by William W. Christie, we take from the *Railroad Gazette:*

In November, 1899, the Hoepfner Refining Company, Hamilton, Ont., began building an octagonal red brick chimney 200 feet high with an octagonal flue 8 feet in diameter of the inscribed circle, this diameter being the




A CHIMNEY FAILURE.

same from top to bottom. It was a single shell and at the pedestal the outside was square. The wall thickness at the top was 26 inches, and at the bottom 66 inches at the thinnest part of the octagonal flats. The building of the chimney continued through the winter, and the brick was laid in lime mortar. From freezing and thrawing, variations in vertical alignment were found and reported and additional work was lined up to correct these changes. Another feature of the work that should be mentioned is the use of some large round boulders in the pedestal walls, some of which were laid bare within

4 inches of the outer faces of the wall when finally the chimney collapsed and the brick work slid off of these boulders. Early in April, 1900, when the spring thaw came, the chimney indicated collapse and the failure came at 1 o'clock a.m., April 18, 1900.

The chimney walls had no offsets such as are commonly used in similar structures. The collapse, by sliding down of the masonry, as shown in the ragged line of the illustration, did little damage to the subfoundation and the limestone base, which extended about 4 feet above the ground. The flue inlet was below ground and the shaft had therefore not been weakened by it. It was decided to rebuild the chimney at once, and the writer of this article designed the new chimney, and its erection was begun in June of the same year. The subsoil was reported as blue clay, and the foundation and limestone work being in good condition, it was decided to repair the limestone base and build the new shaft upon it. The cross section of the new chimney is circular, and thus, with the same outside diameter at the base as the outside dimensions of the original square base, and a smaller outside diameter at the top, a much thinner wall is used and a safe design obtained with a much smaller quantity of brick.

The exterior of the new shaft has three tapers, and the masonry is of common red brick, laid up in Portland cement mortar. At every 6 feet in hight an endless band of wrought iron is built in the wall to bind it together, and the whole is capped with cast iron, in six sections, upon which are secured six lightning rods connected to a band about the cap, and to a copper tape leading down the side to a charcoal bed in the ground. The fire brick lining was laid up 35 feet above the ground, 4½ inches thick, 8 feet inside diameter, and entirely independent of the shaft.

Comparing the original design with that of the new chimney we have:

| Chimney. | Tons per square foot on earth bearing. | Pounds per square inch at base of brick work. | Wall thickness. At top. Inches. | Wall thickness. At bottom. Inches. |
|---|---|---|---|---|
| Original | 1.94 | 117 | 26 | 66 |
| New | 1.164 | 89.3 | 13 | 42 |

120 pounds per cubic foot was used in calculations.

The new chimney was completed early in the fall of 1900. From the tabulation it is seen that by judiciously placing material much may be saved in careful designing.

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By invitation of Sir Marcus Samuel and the managers of the Shell Transport & Trading Company, Limited, a large number of shipowners and marine engineers lately visited the steamer "Clam" prior to her departure from the Thames for Philadelphia. The object of the inspection was to demonstrate the success of liquid fuel, and the logs were produced to show that for two years the steamer had been achieving far better results with oil than had previously been possible with the best Welsh coal. It was stated that in actual experience 18 tons of oil gave more heat than 28 tons of coal, and Sir Marcus Samuel said that the proportion would be much greater in favor of oil now that means had been devised for removing water from the product. The "Clam" has for two years relied solely upon Borneo oil, and her experience has been such as to induce the Shell Company to send a fleet of 18 steamers to sea burning the same kind of fuel. The company claim that from their fields in Borneo they can supply 100,000 tons of oil a day, but the opening of new resources in Texas will enable them to meet the requirements of the whole western hemisphere.

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The *Railroad Gazette* says: "We believe that we are accurate in saying that the new freight equipment authorized by the Pennsylvania Railroad Company numbers now 20,615 cars, and of these cars 19,615 are ordered. It is supposed that all of these will be delivered by the middle of next summer. These cars are placed as follows: Pressed Steel Car Company, 12,686; American Car & Foundry Company, 5150; Illinois Car & Equipment Company, 1275; Altoona, 400; the Pullman Company, 104. Besides these, 15 refrigerator cars for the Grand Rapids & Indiana have been ordered from the American Car & Foundry Company. These cars are all of 100,000 pounds capacity. Of course, we do not know the contract price, but it is something over $1000, therefore we have here in round numbers $21,000,000 of equipment orders. All of these cars have steel under frames, and the coal cars are all steel. As we have said before in speaking of these great equipment orders, they have a certain peculiar significance in fixing policy and practice as regards capacity and as regards steel under frames. In both of these particulars this Pennsylvania order is a step of unusual importance."

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Condemnation proceedings have been instituted for the acquisition of the property of the New York Steam Company, on the East River front, between Fifty-ninth and Sixtieth streets, New York, by the city authorities for the purpose of constructing the Blackwell's Island Bridge. The proceedings were opposed by the Steam Company on the ground that they were a corporation devoted to public uses and that their property was therefore exempt from acquirement by the city without special provision by the Legislature. The decision granting the application for the appointment of commissioners of estimate held that the company were not a public corporation within the meaning of the law and could not therefore be said to hold property to acquire which the city would have to receive authorization by a special act of the Legislature. This action will make the erection of a new plant necessary, provided the present plant is condemned. The company operate a number of steam plants throughout New York City, and the one referred to is designated as Station J. It is of about 8000 horse-power. The general offices of the company are located at 143 Liberty street.

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The York Haven Water & Power Company, now engaged in developing a water power on the Susquehanna River, below Harrisburg, Pa., are building the stone penstocks, retaining walls, &c., from plans made by the Robert Poole & Son Company of Woodberry Station, near Baltimore, Md. This masonry will require about 1,600,000 cubic feet of stone work, and will provide emplacement for 40 turbine water wheels. These latter will operate 20 electric generators, of 750 kw. each, generating a current of 2400 volts, which will be transformed to 24,000 volts for transmission to the towns and cities within a radius of 12 to 15 miles. The order for the turbines and the transmission machinery for this power station has already been placed with the Robert Poole & Son Company, and it is expected that the plant will be in operation in the latter part of 1902.

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The Postal Department at Washington has decided that all mail matter is mailable to Porto Rico in the same manner as to any part of the United States. A large amount of merchandise addressed to people in Porto Rico has been held up by the New York Post Office, and a large quantity of it sent to the Dead Letter Office at Washington pending instructions. The Postmaster at New York has been notified to forward this mail according to the recent decision.

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The National City Bank of New York is considering plans for the erection of a bank building on the site of the old Custom House, which it now owns, to cost more than $4,000,000, and to be the finest structure of the kind in the world. The total cost of building and land, if the idea is carried out, will be in the neighborhood of $8,000,000.

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The American Locomotive Company last week turned out from the Schenectady plant the largest locomotive ever built. It is of the decapod type and weighs 275,000 pounds. It has ten driving wheels and will be used in the freight service in the mountain districts on the Atchison, Topeka and Santa Fé road.

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The John A. Mead Mfg. Company, whose New York offices are in the Bowling Green Building, 11 Broadway, are to furnish apparatus to be utilized for handling hot clinkers in the Canadian plant of the National Portland Cement Company, Limited. The plant will also be equipped with about $60,000 worth of Westinghouse electric apparatus.

# The Decorating of Sheet Steel Painted Ware by Machine Methods.

BY HORACE E. WHITNEY, CAMBRIDGE, MASS.

### Introductory.

Decorating is the art of beautifying, and, as applied to sheet steel ware, is the process of attaching a design for the ornamentation of the article to which it is applied. The impetuosity of commercialism, coupled with keen competition, has had the effect of not only cheapening but of deteriorating all kinds of commodities. This is exemplified in a most striking manner upon the larger percentage of designs on the painted and japanned steel ware of to-day. The ornamentation of these wares, which is to be considered in this work, forcibly shows a cheap rather than a decorative quality as its aim.

The purpose of these articles is to set forth in a very elementary manner a process for decorating the above ware, whereby the labor of manipulation and other costs of production may be decreased, while at the same time the quality and character of the design may be raised to a higher standard of decorative art.

The existing methods of decorating these goods come under three broad divisions:

1. The penciling or brush mode, the ideal method, is strictly a hand process, and its limitations are only dependent upon the skill and dexterity of the worker. It is the standard by which all other methods are compared and judged. The pressure of competition has driven hand work far out of the reach of the manufacturer of to-day.

2. The stenciling method, which consists of applying a design by the aid of a pattern. This way is comparatively cheap and simple as compared with the first, but it has its disadvantages. The design produced is always broken and unconnected. This very fact is suggestive of cheapness, as it shows at once that it is not hand work. It is evident, especially in decorating, that if the employment of machine or mechanical methods is even suggested in a design, the effect produced is at once cheapness. The cutting of these stencils requires a good deal of time and skill, and they wear out very fast. Quite an amount of time is used in sizing, centering and rubbing over the stencil.

3. Decalcomania, which is a process of transferring pictures and designs to the surface which is to be decorated and permanently fixing them thereto. This process is practically too costly for the class of goods which we are considering, on account of the expense of the transfers themselves, as well as the labor required for putting them on.

The new process which we are to consider not only effects a great saving in labor over the above present modes, but produces designs, of unlimited intricateness, which have the appearance of hand work. This process consists of applying the ornamentation by means of dies and rolls upon flat, round, oval and irregular surfaces. These dies and rolls are made of rubber, composition and other soft material. They can be easily and cheaply made, and are attachable to self centering machines, whereby very elaborate designs can be cheaply produced.

Rubber stamps have been used before and are still used to some extent, but their use has not been generally successful, principally because they were used by hand, sized by hand, and only applied to flat surfaces. A very important part of this subject is the sizing and automatic feed rollers, which upon the cheaper grades of ware will produce with a combined size and bronze a complete decoration with a single operation.

### The Molds.

The dies, which were briefly referred to in the introductory are the first requirements of the apparatus used, and in order to make these we must first make a mold, which necessitates a wood cut or an electrotype. The first cost of a wood cut is rather great, depending wholly upon the complicacy of the design, but after one is made there is no limit to the number of molds which can be produced from it. It is better to have an electrotype made from it, rather than to use it direct for making the molds. Electrotypes are not expensive, and if one gets damaged in any way another can be cheaply made. If the design is a small one it is well to have several made, so that a number of impressions can be made in the mold at one time, which will allow several stamps to be made at one vulcanization.

In making your designs do not have too much fine line work, as the dies made from them readily fill with size, causing a heavy effect.

It is imperative that you impress on the mind of the wood cutter, who usually makes his cuts for the printer, to cut the wood as deep as possible, leaving the line work projecting ⅛ inch, so as to give ample clearage to the back or unused part of the stamp, for rubber, not like metal, is compressible.

We shall need a mold plate to hold the molding material, a chase, with set screws, to lock the electrotypes in, and a small press with which to make the impressions in the mold. This same press may be used later on to force the rubber into the mold in the vulcanizing process.

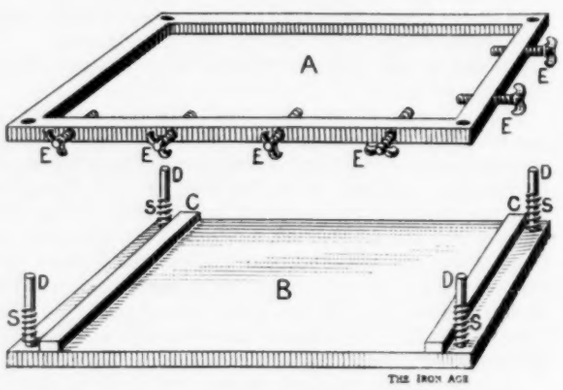


*Fig. 1.—Iron Chase and Mold Plate.*

DECORATING SHEET STEEL PAINTED WARE.

In Fig. 1 A is the chase to hold the electrotypes, B the mold plate, C C the distance pieces or leveling gauge, D D the upright guide posts or trunnions, E E E the set screws to lock electrotypes in the chase and S S spiral springs to throw chase out of the mold. A common second-hand letter press will answer admirably for the press.

In Fig. 1 the chase may be of any size, but a 7 x 10 inch opening is the size which the writer has found convenient. The mold plate ought to be as wide and long as the outside dimensions of the chase. In each corner of this plate an upright post or trunnion should be inserted, to act as guide to the chase, which should have holes drilled to correspond. It is essential to have two distance pieces, ¼ inch high by ½ inch wide, fastened to the plate just inside the posts, and have spiral springs placed around the posts so that they will lift the chase free and clear from the mold plate.

Place the chase over the mold plate, enter the posts in the holes, and put into the press. Screw down the press until the chase bears equally upon the distance pieces. If the upright posts hit the platen of the press and prevent your accomplishing this, then four large holes should be drilled in this platen, which will allow the pins to go through. Release the pressure. The spiral springs should then throw the chase up at least ½ inch above the distance pieces. If all works satisfactorily after the above trial we have our vulcanizing press, chase and mold plate complete and are ready to make the mold. We shall also need a small trowel for mixing, a steel or brass straight edge, which shall be just long enough to go between the upright posts and bear on each of the distance pieces, and a small marble slab for mixing purposes.

The molding compound consists of:

| | |
|---|---|
| Soapstone (French chalk) | 1 pound 3 ounces. |
| Plaster paris (dental plaster) | 1 pound. |
| Kaolin (white china clay) | 1 pound. |

Mix these ingredients thoroughly together.

The mixing compound is:

| | |
|---|---|
| Dextrine | 5 ounces. |
| Hot water | 1 quart. |

This should always be allowed to cool before using.

Put the molding compound on the marble slab and add enough of the mixing compound (not over 1.5 to 2 ounces) to mix thoroughly to the consistency of soft putty. When it has been thoroughly worked together, spread it evenly over the mold plate. Take the straight edge, and, resting it on the distance pieces or leveling gauge, draw it toward you several times until the compound is spread evenly over the mold plate. If much of the compound sticks to the straight edge it is because it is too soft. Wait two or three minutes, which will give it time to set a little harder, and in the meantime scrape and wash the straight edge clean. It is well always to dip the ruler in water before using, which will aid in smoothing the surface, and at the same time prevent the compound from sticking to it.

The next step is to securely lock the electrotypes in the chase, using great care in getting them perfectly level. In about five minutes from the time you first began to mix the compound it should be in proper shape for the first impression. Lay a piece of tissue paper on the mold and a fine piece of muslin cloth over this. Slide the chase evenly down the trunnions until it rests on the springs directly over the mold and put into the press. Put two thicknesses of light tin strips on the distance pieces so as to prevent the chase going fully home. Screw the press down as far as it will go and then release. Remove the cloth and paper, and there will be a rough outline on the mold.

After waiting four minutes, brush the electrotypes over with benzine, remove one of the tin strips from each side and again screw the press down tight. After releasing you will find a much clearer impression in the mold.

Wait another four minutes and repeat the operation just the same as the second time, only remove all tin strips and screw the press up as tight as possible. After this impression, the bottom of the mold, where the face of the electrotypes has pressed, should be very smooth and shine as though polished. If the mold does not have this appearance, and is still soft enough, a fourth impression may be taken. If, on removing the mold plate from the press at any time, it is found that any of the compound remains stuck in the electrotypes, it may oftentimes be remedied by making another impression, or by picking the compound out of the electrotype and putting some more compound, from the blank part of a mold, into the injured part and making another impression.

The next and last step in mold making is to thoroughly dry the water out of the mold, otherwise it will crack when subjected to the heat of the vulcanizing process. This is best accomplished by subjecting it to a mild current of hot air. If too much heat is applied at first it will all crack up and be ruined. The best place to dry it is on the bed of the vulcanizing press, to be described further on, with the burners turned down low. It should take at least two hours, and it is better not to use it until the next day, especially if it is to be used more than once. The above plaster method of making molds is the one best suited for general use on account of the ease and cheapness of making.

The typical mold is the steel one, as it requires no wood cuts, and once made it may be used forever. The only objection is their cost, especially if the design is elaborate. Steel molds can be easily and cheaply made, for striping and line work for decorating flat surfaces, in the planer. A series of small and large dot chain work, for border designs, may be simply made by drilling holes through a steel plate ⅛ inch thick and backing this plate with another thin steel plate.

Molds may also be made from oxychloride of zinc cement, the stereotype process as used by newspapers in making their matrices for their type, and of soft metals.

### The Making of Rubber Dies.

It is practically impossible to cast India rubber in molds, but it can be shaped in a mold by a combination of heat and pressure.

The rubber used in making stamps is especially prepared by manufacturers for this purpose. Much of the trouble of the novice in making rubber stamps arises from the use of vulcanized rubber, or of a wrong composition or thickness. It regularly comes in sheets, about 1 yard wide and about ⅛ inch thick. Its color ranges from a light to a dark gray, and one side is covered with cloth to prevent its sticking together. A very satisfactory rubber may be purchased from Eugene Doherty, 110 Kent avenue, Brooklyn, N. Y., at about 70 cents per pound.

To carry out the process of making rubber dies we shall need a press and an arrangement to heat it to about 300 degrees. The letter press used in making our molds is well suited, and should be fastened on a bench which has had a hole previously cut through about the size of the base of the press, leaving just room enough for the screws to fasten the outside edges strongly to the bench. If convenient, pipe four Bunsen gas burners, in the form of a cross, under the bench so that the flames just touch the bottom of the press. It is well to put a sheet iron oven or hood (with a small door to facilitate getting at the burners) around the burners under the bench so as to hold all the heat under the base of the press and also prevent the wood work scorching. If gas is not convenient kerosene or alcohol lamps may be substituted. A thermometer registering over 300 degrees will be necessary to judge the right heat.

When the above arrangement has been satisfactorily fitted up screw the platen of the press hard down onto the base, light the burners, also place the thermometer on top of the platen plate, and allow the press to heat up until the thermometer reaches the 300 mark. At the same time place the mold plate containing the mold on top of the platen plate and allow it also to heat up with the press. The mold should have had all roughness or unevenness removed with fine sandpaper, care being taken to blow all particles of dust out of the design work. Meanwhile cut a piece of stamp rubber to the size required and sprinkle it over with French chalk. When the mold plate is hot enough to siss when moisture is applied, lay it on the bench and sprinkle French chalk all over the mold, carefully removing all surplus from the impression parts. Next, place the rubber, cloth side up, over the design. The thermometer by this time should have reached 300 degrees, and, if so, turn off the heat burners. Raise the platen of the press, and put the warm mold with the rubber into the press, so that the upright posts will pass through the previously drilled holes in the platen plate, thus allowing the platen to bear firmly on the rubber. Lay a piece of paper or tin on top of the rubber, to keep it from sticking to the platen, and screw the press tightly down. As the rubber becomes hot it begins to soften and flow, and the press should be screwed up tighter from time to time, thus driving the putty like material into all the interstices of the mold.

It should be allowed to vulcanize for about 15 minutes from the time it is first put into the press. As some of the rubber is sure to protrude, the progress of vulcanization can be watched and judged by the point of a knife. Before the stamp rubber is heated it is somewhat soft and elastic; as the heat is applied it becomes soft like putty; as the heat increases it again stiffens and becomes very elastic. At this point, which, as previously stated, should be about 15 minutes, the press can be unscrewed and the rubber removed from the mold.

The rubber will now present a bluish slate color. Strip the cloth from the back and dust the stamp all over with French chalk; this makes the dies have a much better appearance. With scissors trim all the waste edges off and cut apart if more than one design has been made. The stamp should be a perfect reproduction of the mold in all its minutest details.

### Rubber Rolls.

The rubber dies which we have just considered are used mostly for decorating flat surfaces. We shall need for round and oval surfaces rubber rolls, so made that they will conform to the surfaces to be ornamented. These rolls are used for applying the decoration to pails, cuspidores, waiters and many other articles which will suggest themselves. It is best to get the material for these rolls, and, in most instances, the rolls themselves, at a reliable rubber factory. They should be made particularly from a pure soft material. It will be well to

classify these rolls, for convenience of description and illustration, into three classes, as follows: 1, Pail or broad striping rolls; 2, cuspidor or fine striping rolls; 3, waiter or broad striping and design rolls.

The first class, or broad striping rolls, are shown in Fig. 2. The dimensions are: 2 inches outside diameter, 1½ inches inside diameter, 5-16 inch across the top or bearing surface of the roll, ¼ inch wide or width of rubber, lugs 3-16 inch projecting by ¼ inch wide. These rolls are made from simple molds, and used principally for striping all kinds of pails. The molds for these are made by turning in an iron plate, of ¾ inch thickness, a round groove and cutting two lugs projecting inward corresponding to the above dimensions. A rubber concern quoted $7 on making this mold, but one was made in the factory where the rolls were used for less than $4. Rolls made from this mold should not cost over $1 per dozen, and should be made of a pure gum material as soft and pliable as it is possible to make them. These rolls require a wooden roll, with a groove turned about ⅛ inch deep, with two corresponding slots cut to exactly fit these rubber rings. The purpose of the wooden roll is to answer for a support for the rubber ring, and the idea of the lugs is to prevent the ring from turning on the wood roll.

The second class, or fine striping rolls, are used for decorating cuspidors and other articles requiring a fine stripe. As these rolls vary in shape, according to the work they are applied to, it is advisable to make these in another way without molds. When once made they last a long time and will stripe many pieces of ware. The material used in their making must be a pure gum, but need not be quite as soft as used for the rings. Turn a roll out of wood to the exact size and shape of the roll that is desired in rubber, and take this as a pattern to a rubber factory, and they will make a plain rubber roll and turn it to the exact size and shape of the wood pattern roll. To facilitate the work it is a good plan to have templets made, from sheet zinc or tin, of any curved or irregular parts of the roll. The roll Fig. 3 was so made and costs 65 cents.

The third class, or irregular design rolls, are the most difficult and most expensive of all the rolls to make. The one shown in Fig. 4 is a plain grooved roll for banding waiters or tea trays. Fig. 5 shows an irregular design roll for putting a fancy ornamentation on tea trays. The same rubber concern who made the roll shown in Fig. 3 quoted $80 for an engraved steel mold to make this roll in. Of course, after a mold was once made it would cost very little for the rolls, but a mold would have to be made for each design. Therefore it is cheaper, on a whole, to make these rolls by hand, as follows: First procure a plain band roll (Fig. 4), and make a sketch on the bearing surface of the design to be cut. With a sharp knife the design can be cut much easier than one would imagine at first thought. Any one who is used to cutting design stencils can readily make one, and the roll shown in Fig. 5 was made in this manner in about six hours.

**Composition Dies.**

Hitherto only India rubber has been considered for the making of dies and stamps. There is a composition, commonly used for printers' rolls, the chief ingredients of which are glue, molasses and glycerine, which, for our purpose, is an excellent substitute for rubber. Properly made it has nearly all the flexibleness and elasticity which characterize India rubber. It will not produce the intricateness of the molds quite as well, also has a tendency on cooling to slightly contract, and hardens somewhat with age. It is also somewhat affected by the weather. All these defects, however, may be greatly lessened by using good formulas and proper care in making. One of its great advantages is that it is not acted upon by sizes, and another is that it is easily and cheaply made, and can be cast directly into the molds. A very practical and valuable formula for this composition, and one which is in use in a very large printing house, is as follows:

*Composition Substitute.*

| | |
|---|---|
| Glue | 22 pounds. |
| Water | 8 quarts. |
| Glucose | 4 quarts. |
| Syrup | 4 quarts. |
| Glycerine | 10 quarts. |

The glue is first put in a vessel and covered with the water, and, when thoroughly soft, heat is applied until melted. Next add the glucose, syrup and glycerine. The whole should be thoroughly mixed, and the heat continued until the greater part of the water has been expelled, which will require some little time. When it has reached the proper stage it may be poured directly into the molds or into a tin pail for future use.

If poured into the mold it should first be warmed a little so that it will not chill the composition and prevent it from running into the finest detail of the mold. It is very important that the mold or pail should be previously greased with lard oil to prevent its sticking.

In summer use 5 quarts instead of 4 quarts of both the glucose and syrup. To produce a harder composition use less syrup and more glucose, adding the same amount to the glucose that is taken from the syrup. Also reduce the glycerine. The more syrup or molasses the softer the composition. Glycerine, in the same manner, the more that is added the softer the mixture, and *vice versa*. Glucose, on the other hand, is just the opposite, the more that is added the harder the composition.

Shrinkage or contraction in cooling is due to an excess of water and insufficient cooking. Hardening, from keeping, is too little syrup or glycerine, and too much glue or glucose. This composition may be molded in plaster molds, but metal molds are especially recommended.

There are a great many other formulas for this composition, but after a trial of a great many the writer prefers this one. This composition may also be purchased by the pound all ready for melting from the printers' supply houses.

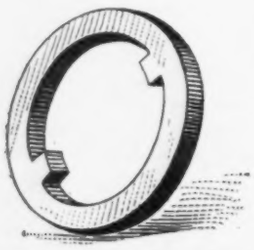

*Fig. 2.—Broad Striping Roll.*

*Fig. 3.—Fine Striping Roll.*

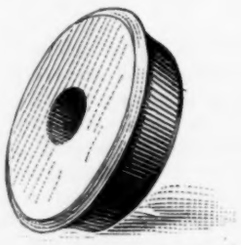

*Fig. 4.—Plain Banding Roll.*

*Fig. 5.—Design Roll.*

DECORATING SHEET STEEL PAINTED WARE.

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President Stilwell of the Kansas City, Mexican & Orient Railroad announces that he has entered into a contract with a Belgian company to furnish rails for the construction of that line. The first shipment will be made within 90 days.

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The Shickle-Harrison-Howard Iron Company, St. Louis, Mo., have filed a notice of an increase in their capital stock from $1,000,000 to $2,250,000.

## American Exhibition in London.

Offices of *The Iron Age*, Hastings House, Norfolk Street, Strand, London, W. C.

As has been previously announced in the columns of *The Iron Age*, the proposal to hold an American Exhibition in London from May to September next year has been accepted by American traders in this country and by the Crystal Palace authorities. It is yet early to prophesy which section of American trade will be most prominent, but, judging by the number of contracts for space taken out by American metal working firms, there can be little doubt that the iron and steel trades of America, both heavy and light, will be well represented. The value of these exhibitions naturally depends upon the number of exhibitors. In this instance the exhibition is absolutely unique, for it is to be exclusively devoted to American industries, and is yet to be held in London. The period over which the exhibition will extend is admirably chosen, for it clashes with no other of any importance.

The decision to hold the exhibition in the grounds of the Crystal Palace is, on the whole, a wise one. The directors of this beautiful edifice have for some time past been steadily cultivating exhibitions of one sort and another; cycles, shoe and leather, naval and military and other interests and trades have during the past two years found temporary lodgment under the glass dome of the Crystal Palace. The building alone covers 16 acres, well lighted, heated and ventilated, while it is surrounded by ornamental grounds extending over 200 acres. During the summer months about 2,000,000 people visit the Crystal Palace. An exhibition held under these auspices is in the nature of things bound to be well advertised. Nor must it be forgotten that the Crystal Palace was built to house the great International Exhibition of 1851, so that in most respects, at any rate, the Crystal Palace is well suited for this purpose. The only drawback is the railway service. But when we remember that trains run to the Crystal Palace from Victoria, Charing Cross, Ludgate Hill, St. Paul's, Cannon Street and London Bridge, it is possible to exaggerate this little drawback. In point of fact, one can be in the Crystal Palace 40 minutes from the starting of the train from any of these termini. I understand, however, that serious representations have been made to the railway companies by the Crystal Palace authorities, with the result that they are at the present time considering some scheme whereby the time may be reduced by 20 minutes or so.

The American Exhibition will be held from May to September next year. The general arrangements have been placed in the hands of W. B. Bancoft, an American, who lately distinguished himself by bringing out the Directory of Americans in London. An Advisory Board, consisting of the following prominent Americans, has been appointed:

J. Morgan Richards, chairman.
D. C. Haldeman, vice-chairman.
B. F. Stevens, hon. treasurer.
F. C. Van Duzer, hon. secretary.

Thomas L. Field, E. Marshall Fox, Col. Millard Hunsiker, Frank W. Jones, Frank E. Bliss, Thomas Clarke, R. Newton Crane, R. J. Davis, J. Walter Earle, James MacDonald, John G. Meiggs, George A. Mower, Isaac Seligman, William Hall Walker.

The above are the officers and General Committee of the American Society in London.

A. Bedford, R. W. Blackwell, W. J. Boller, F. A. Branion, Col. G. Earl Church, Charles Churchill, Wm. J. Clark, Samuel G. B. Cook, W. D. Craven, Robert N. Fairbanks, W. H. Fassett, Dr. G. W. Field, Charles T. Fox, L. H. De Friese, Henry S. Downe, J. W. Downer, Thos. J. Farrell, F. M. Fisk, Clark Harrison, Louis C. Hay, Charles A. Knight, Geo. S. Mahana, A. Parrish, F. C. Poisson, John L. Sardy, S. H. Short, F. J. Stevens, J. G. White, Irving G. Will.

The above are members of the American Society in London.

Class I is devoted to machinery and mechanical industry, and is divided into four sections: *a*, mining, agricultural, printing, electrical traction, &c.; *b*, shipbuilding, locomotives, railway and tramway engineering and equipment; *c*, automobiles, bicycles, typewriters, sewing machines, laundry, domestic and other labor saving appliances; *d*, hardware, tools and cutlery. Class V is devoted to carriages, vehicles, harness, furniture, &c. Class VI to hygiene, lighting, heating, ventilating and sanitary appliances. Provision has thus been made for practically every line in which readers of *The Iron Age* are more or less directly interested.

It may be worth while at this point to mention the extent of trade done in imported goods in which America is interested. During the first ten months of this year England imported $1,150,000 worth of brooms and brushes, an increase of $75,000 on the same period last year. Over $2,000,000 worth of clocks came in, of which $400,000 were American. One hundred and fifty thousand dollars' worth of cutlery was bought, compared with $80,000 during the first ten months of last year. There is a marked setback in the purchase of electrical goods and apparatus, for last year during the period in question we imported $4,800,000 compared with $3,800,000 this year. On the other hand, the British purchases of hardware are still going up—$450,000, compared with $350,000 last year. Finished iron or steel manufactures may be set out as follows:

| | Ten months ended October 31, 1900. | 1901. |
|---|---|---|
| Girders, beams, joists and pillars | $3,127,285 | $3,524,960 |
| Rails, steel for railways or tramways | 1,185,440 | 1,773,120 |
| Tires and axles | 209,375 | 156,705 |
| Cycles and parts thereof, including those with motors | 871,520 | 778,940 |
| Unenumerated | 14,662,390 | 14,913,470 |

These figures are in every way encouraging, but they are relatively small compared with what America could sell over here if business were not so brisk on your own side. It is possible, of course, that in six months' time trade will not be so good with you as it is to-day, and by then many American exporters may be glad to undertake business in this country, which at the present moment is beyond them. If there are any who feel like this, the American Exhibition is well adapted to provide them with an entrance into English commercial life. Among those who have already definitely taken out space I may mention:

The American Waltham Watch Company.
The Standard Oil Company.
The Fairbanks Company (scales, &c.).
N. W. Stiles & Son, agents American Soda Fountain Company.
Standard Desk Company.
Charles Churchill & Co., Limited (representing American machinery manufacturers).
H. J. Heinz Company of Pittsburgh.
Remington Typewriter Company.
Babcock, Wilcox & Co., Limited (boilers, &c.).
The General Electric Company of New York.
T. W. & C. B. Sheridan (printers' and binders' machinery).
Niles-Bement-Pond Company.
M. G. Thompson & Co., opticians, Buffalo, N. Y.
Mutual Life Insurance Company of New York.
Fidelity & Deposit Company, Maryland.
Bissell Carpet Sweeper Company of Grand Rapids, Mich.
Davis, Allen & Co.
Johnstonia, Limited.
Peabody & Co.
Wedwell Lawn Mowers.
Wellman-Seaver Engineering Company, Cleveland, Ohio.
National Cash Register Company.

In addition, of course, to the foregoing firms who have definitely decided to take stands, negotiations are proceeding with a number of other prominent American houses.

Thus, when the exhibition opens, we may expect a scene of continual animation, military bands, concerts and other attractions. It will be found by everybody concerned that the Crystal Palace is an uncommonly enjoyable place to spend the summer days. S. G. H.

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The following awards have been made for supplies for the Puget Sound Navy Yard, bids for which were opened December 3: Classes 1 to 11 and 14 to 22 to the lowest bidders; 12, Taunton-New Bedford Company; 13, Crucible Steel Company; 23, Manning, Maxwell & Moore; 24, Pratt & Whitney Company; 25, 26 and 27, Henshaw, Bulkley & Co.; 28, U. Baird Machinery Company.

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Information has reached the Navy Department that the strike at the Union Iron Works at San Francisco is ended, and that the construction of battle ships has been resumed.

## Water Power Development at Hannawa Falls.*

BY WALLACE C. JOHNSON, NIAGARA FALLS, N. Y.

The most important factor which has contributed toward the pre-eminence of the State of New York among the States of the Union is the waters of the streams flowing through her territory or along her borders.

The second in importance as a source of power is the drainage from the elevated forests of the Adirondack Mountains. Here are upward of 11,000 square miles, 800 feet or more above the level of the Hudson at Albany, and 500 feet or more above the St. Lawrence and Lake Champlain. The amount of power which it is practicable to obtain from the water flowing from this vast area in its descent to the lower levels is very great, and is a natural resource of great value. The State of New York, by establishing a forest preserve covering substantially all of this area, has insured its preservation as a source of power.

### Location.

The Legislature now has it in its power to double the value of this great resource by passing a law which will permit the construction of reservoirs within this forest domain under proper restrictions. The largest river to draw its water from this region is the Hudson, which drains 4000 square miles of this forest, not including the water received from the Mohawk. The second is the Raquette River, which drains an area of upward of 1100 square miles. This drainage area is nearly all within the great elevated plateau lying on the north slope of the Adirondacks at an elevation of from 1200 to 1600 feet above the sea level. The Raquette River is further remarkable in that it has a drop of about 300 feet in the first 3 miles of its course below Colton, and a further fall of 85 feet in the next 2 miles of its course.

The land and water rights along this part of the river have been acquired by the Hannawa Falls Water Power Company. The lower 85-foot fall has been developed first. A dam has been built at the village of Hannawa Falls, which forms a pond 2½ miles long and covering about 200 acres. From this pond the water is conducted by a canal about 2700 feet long to a forebay, thence by penstocks to the wheels. The tailrace extends about 2000 feet down from the power house, being separated from the river by an embankment of earth and stone.

At the point selected for the dam the bed of the river was entirely Potsdam sandstone, the strata dipping at an angle of about 30 degrees with the horizontal down stream. The banks of the river at this point were nearly perpendicular walls of sandstone about 375 feet apart, up to a level of about 10 feet below the crest of the dam.

The general plan of the dam and entrance to the canal is shown in Fig. 1. On the west bank of the stream a wing wall was built on top of the ledge forming that bank of the river, and on the down stream face the wall was carried down to the river bed. This wing wall was carried to a hight of 8 feet above the crest of the dam. From the back of this retaining wall a core wall of concrete 3 feet in thickness was built from the rock up to the level of about 6 feet above the crest of the dam. This core wall was about 85 feet in length, and ran back to a point where the level of the natural ground was above the top of the wing wall. From the back of the wing wall an earth fill was made on each side of the core wall having a top width of 8 feet and a slope on each side of two to one, making the connection between the wing wall and the natural bank. Running east from this wing wall the overflow dam proper was 234½ feet in length. Then another wing wall 8 feet in thickness, and an opening for waste gate 15 feet 6 inches wide, and another wing wall against the bank on the east side similar to the one on the west side above described, both 8 feet above the crest, completed the dam. A section of the overflow dam is shown on Fig. 2. The

*Fig. 1.—Plan of Dam.*

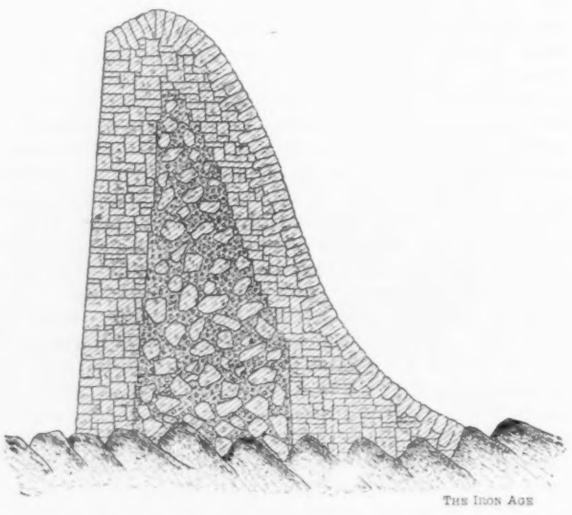


*Fig. 2.—Section of Dam.*

WATER POWER DEVELOPMENT AT HANNAWA FALLS.

general level of the river bed was about 30 feet below the crest of the dam, but owing to the dip of the rock, strata being very irregular, some points in the dam were 40 feet below the crest. This irregularity, presenting as it did faces of rock nearly at right angles to the line of pressure, made the best foundation obtainable for the dam. No excavation was made, therefore, for a foundation, except to form a seat for the toe of the dam.

The materials for the construction of all the masonry work were obtained from the large quarries of the Potsdam Red Sandstone Company, who are located on the west bank of the river between the dam and the power house. This stone is obtained from the quarry with very level beds, and no cutting was done on any part of the work except to level the crest of the dam after the stone was in place. For the down stream face of the dam stones from 12 to 18 inches in thickness and not less than 2 feet wide and 3 feet to 4 feet in length were used, the beds being laid normal to the surface. For the up stream face of the dam a rubble wall about 3 feet thick was laid of smaller stone. The space between was filled with great bowlders and irregular shaped quarry stones with concrete rammed in around and between. Natural cement, Union brand, was used throughout, except for laying the stone on the down stream face of the dam, where Giant Portland was used. Natural cement concrete was mixed in the proportions of 1 part cement, 2 parts sand, and 4 parts broken sandstone.

* Abstract of paper presented at the New York meeting (December, 1901) of the American Society of Mechanical Engineers.

The dam was completed in the fall of 1899, and has had 4½ feet of water on its crest in two different seasons. When the water is below the crest the dam is perfectly tight.

**Waste Gate.**

It was thought desirable to be able to control the level of the water in the pond, was necessary to provide for the passing of large quantities of logs by the dam, and was also desirable to have a means of discharging *débris* floating in the stream and preventing its entering the canal; for these reasons the 15½-foot space at the end of the dam was closed by a steel waste gate, shown in detail in Fig. 3. This gate consists of a steel frame closing the 15½-foot space, the sill being 30 feet below the crest of the dam. At the bottom are two openings, 6 feet square, which can be closed by gates operated by hydraulic cylinders. At the top are two other openings about 6 feet square, closed by gates which are opened by being pushed down, permitting as great a depth of water as desired to flow over the top of the gate. Both of these gates have worked very freely and accomplished the purpose for which they were designed.

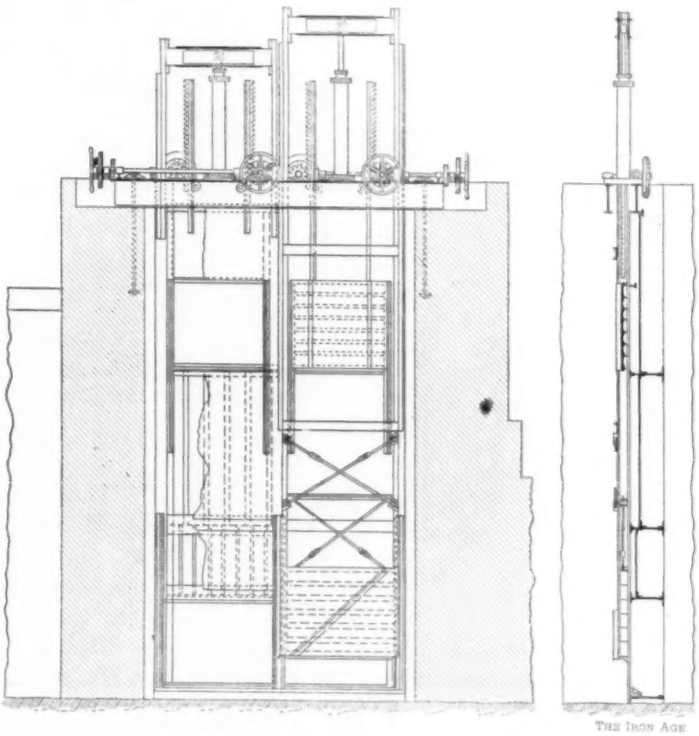


*Fig. 3.—Detail of Waste Gate in Dam.*

WATER POWER DEVELOPMENT AT HANNAWA FALLS.

The entrance to the canal is in the east bank of the pond, about 42 feet above the dam, the width of the entrance being 80 feet. For the purpose of permitting the canal to be closed, by means of stop gates, four piers, 4 feet in thickness, were built at equal intervals in this 80-foot opening, leaving five openings, each 14 feet 7 inches in the clear, and arches were turned on these piers, forming an arch bridge across the entrance to the canal. A little below the entrance to the canal is a waste weir and gate, by means of which the water can be drawn from the canal into the river, as shown in Fig. 1. This waste weir is also spanned by an arch bridge.

**Canal.**

The canal, from the dam to the forebay, about 2700 feet in length, is 20 feet in depth from the top of the banks, the bottom being 14 feet below the crest of the dam. The topography of the ground through which it passes is such that it was possible to lay out the canal so that for the greater part of its length it would be partially in excavation and partially in embankment, the material taken from the excavation being nearly all used in making the embankments. The bottom width of the canal is 30 feet, the top width 110 feet, making the inside slopes two to one in all cases. The width of the top of the embankment is 8 feet, and the outside slopes 1½ to 1. The materials excavated were, for the most part, a gravelly loam, overlying hard packed sandstone chips and sand mixed with some clay, which, though hard to excavate, proved to be excellent material for embankment. Much care has been taken in letting water into the canal and in compacting the embankments. They are now entirely free from leakage. The outside of the banks and the inside down to the water have been given a dressing of stable manure and sown with quack grass, which is now growing luxuriantly, presenting a very pleasing appearance, as well as being of substantial benefit. The section of the canal was designed to carry 2500 cubic feet per second of water, with a velocity of 3 feet per second, it being the intention to use that quantity of water when available.

**Forebay.**

It is also likely that the Hannawa Falls Water Power Company, together with other water power owners on the same river, will be able to construct reservoirs which will maintain a constant flow of 2500 cubic feet per second in the river. The canal ends in a forebay (shown in Fig. 4), from which the penstocks lead down to the power house on the bank of the river below. At the entrance to the forebay the canal is some 4 feet in excavation, the balance is embankment. The ends of the banks are supported by retaining walls, to which the forebay walls are connected. From the retaining walls core walls of rubble masonry from 4 to 6 feet thick are run back into the center of the embankment about 50 feet, and down to good material. To prevent water following along the face of the wall and so through the bank, three buttresses about 3 feet square are built on each side of the core wall.

The forebay walls are of a form and dimension shown in Figs. 4 and 5. They are built of concrete, having stone imbedded in it, and the outside faced with sandstone blocks 6 to 8 inches thick and 10 to 12 inches deep.

In the walls are imbedded the ends of seven penstock pipes, six 10 feet and one 6 feet in diameter. The 10-foot pipes are enlarged to 12 feet in the upper 4 feet of their length. Around the outside and flush with the masonry is a band of 6 x 6 angle iron riveted to the pipe. The penstocks are set 18 feet apart on centers; midway between each two is a buttress of stone masonry 4 feet wide and 2 feet thick. To the outer corners are fastened 6 x 6 angles, forming slides for the head gates. This arrangement leaves a space 2 x 14 feet for the free admission of air to the penstocks. The gates are of wood and are hoisted by a rack and pinion, being connected to one main shaft, which is operated by an electric motor. In front of the gates are the racks supported by a steel frame, the gates and racks being covered by a wooden building.

The natural ground upon which this forebay was built was fine sand. The walls go down to the bowlder hard pan, found at depths varying from 3 to 10 feet below the bottom of the forebay. To prevent any leakage of water under the walls the entire bottom of the forebay has been filled to a depth of about 3 feet with clay, packed by water, and on top of this is about 4 inches of concrete, in which expanded metal has been imbedded. This concrete and expanded metal lining is also carried back 50 feet into the canal, on the bottom and sides of the canal, and attached to the top of the wing walls, as they follow the slope of the bank. Where the concrete and metal lining is put on the sides of the embankments 3 x 10 inch planks were set up edgewise and imbedded in the earth, the length being up and down the bank, the expanded metal being fastened to the edge of the planks before the concrete was put on. These precautions were considered necessary on account of the treacherous material on which the forebay was built, and they have proved entirely efficient, as there is no leakage whatever from the forebay.

About 100 feet in front of the forebay is the high bank

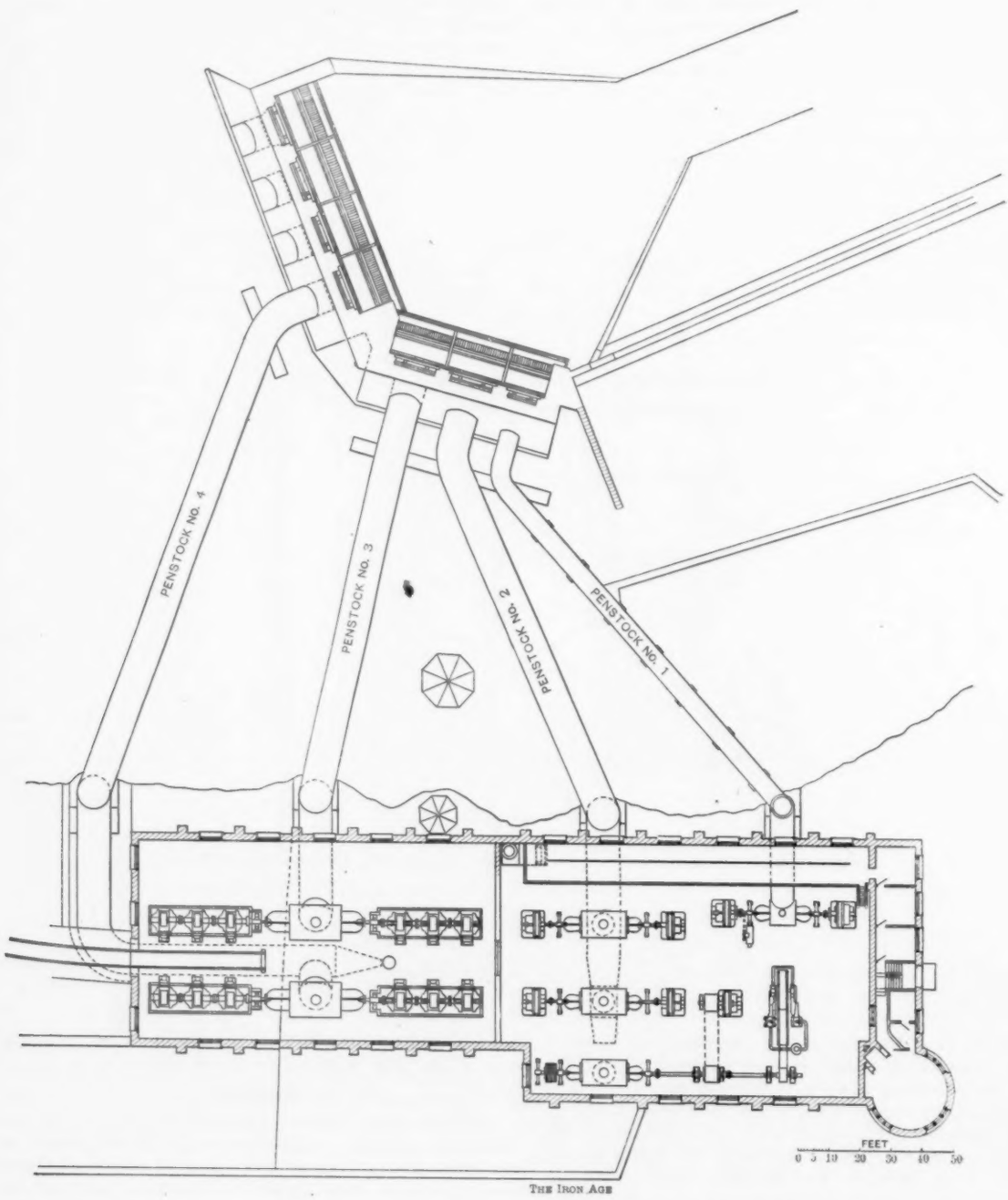


*Fig. 4.—Plan Lower Floor of Power House and Pulp Mill, Showing Penstocks and Forebay.*

## WATER POWER DEVELOPMENT AT HANNAWA FALLS.

of the river, the water of which at that point is about 75 feet below the crest of the dam. Between the water of the river and the face of the high bank was sufficient room for the power house. At that point a building 250 feet in length by 60 feet in width for one-half its length and 75 feet in width for the balance, two stories high, has been built. The floor of this power house is 72 feet below the crest of the dam. The tailraces have been excavated so that the water in them stands 12 feet below the floor when the wheels are running, giving a working head of 84 feet on the wheels.

**Building.**

The building is constructed entirely of Potsdam sandstone and steel. The floors are concrete with expanded metal, and the roof is built of sandstone flags, 2 inches in thickness, laid on T-irons. The lower floor is 22 feet in clear, and is served by a traveling hand crane of 16 tons capacity. The upper floor is 10 feet in clear below the bottom chords of the trusses. A space 12 feet wide across the up stream end of the building, including the tower at the southwest corner, has a mezzanine floor between the first and second stories, which is used for offices. The lower floor of the building, at the south end, a room 115 feet long by 75 feet wide, is the electric station. A space 12 feet in width, along the east side, the floor of which is on the same level as the office door, is used as a switchboard gallery, the space underneath being used as a transformer room. At the south end of the room and on the east side is a 1250 horse-power water wheel, fed by the 6-foot penstock mentioned above, to either end of which is direct coupled a 350-kw., 3-phase, 4440-volt generator. Underneath the north end of this room is one of the 10-foot penstocks, in which there are three openings for receiving three wheels similar to the one above described. To each of two of these wheels will be connected two generators similar to those now connected with wheel No. 1, and the fouth will be provided with an extension shaft, to which will be belted an air compressor and other machinery.

The penstock pipes were built of steel 5-16 inch and ⅜ inch in thickness, specified to contain not more than 6-100 of 1 per cent. of phosphorus, to have a tensile strength of from 52,000 to 62,000 pounds per square inch, 25 per cent. elongation, and 50 per cent. reduction. The plates were furnished—bent and punched—by the Variety Iron Works of Cleveland, and erected in place by day labor.

**Water Wheel.**

The water wheel consists of two American type runners on the same shaft, discharging outward. The wheel shaft stands at right angles with the penstock, which enters the wheel case on the side. The flow of water through the wheel is regulated by guides connected to a cast iron ring and moved by an eccentric. The water is discharged through quarter turns and draft tubes to the tailrace. The runners are built of gun metal bronze, so called, the movable guides of cast steel, the shaft of hammered iron, the case and draft tubes of rolled steel, and the balance of the work of cast iron. The wheels were built by James Leffel & Co. under a contract in which the general form and dimensions, the kind and quality of materials and the speed, power and efficiency were specified. The speed is regulated by a Lombard governor geared directly to the gate rigging.

**Generators.**

The two 350-kw. generators are connected to the wheel shaft by plate couplings having a movable plate between the faces. Both sides of this movable plate have a feather formed out of the same piece of metal and fitted to corresponding seats in the faces of the coupling. This enables the coupling to be driven with only two bolts, which can be quickly removed and the plate taken out in case it is desired to run either of the generators without the other. This wheel and generators run at 300 revolutions per minute. The two 350-kw. generators are of the revolving field type, having 24 poles and delivering three-phase current at a frequency of 60 periods per second and a pressure of 4400 volts. Excitation is by two belted exciters, each of sufficient capacity to supply both generators.

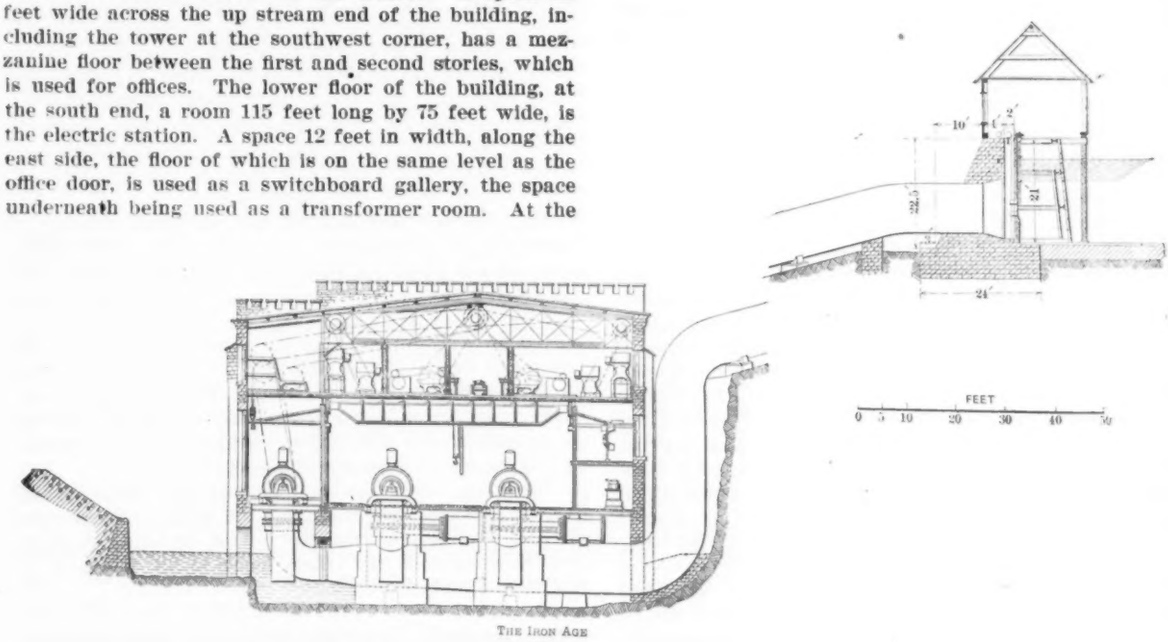


*Fig. 5.—Cross Section of Power House and Forebay.*

WATER POWER DEVELOPMENT AT HANNAWA FALLS.

The switchboard, of Vermont marble, consists of two generator panels with indicating instruments, one exciter panel with switches and instruments for both exciters, two 4400-volt feeder panels, with relay, circuit breakers, oil break switches, and watt meters, one 220-volt panel with seven distributing switches, one transformer panel, and one 20,000-volt panel with three quick break switches having marble barriers.

The Hannawa Falls Water Power Company own the electric lighting plant in the village of Potsdam, 4½ miles from the station. A double line has been built, each line consisting of three cables of seven strands each of No. 10 aluminum wire. This line was figured to transmit 375 kw. with a drop of 400 volts, delivering 4000 volts at Potsdam. The 20,000-volt line is intended to run to the village of Colton, 10½ miles from the station, and thence to the city of Ogdensburg, 19 miles further. The 220-volt feeder panel was intended for station lighting and local distribution.

**Wood Pulp Mill.**

All of the lower floor of the power house building not occupied by the electric station above described and

all of the second floor will be occupied by a ground wood pulp mill of a capacity of 100 tons per day. Large quantities of spruce wood for the manufacture of pulp are still available in the region tributary to the Raquette River, and the location is within easy reach of the great pulp wood district of the Province of Quebec. For the purpose of shipping in wood and shipping out pulp, as well as for general purposes, the Hannawa Falls Water Power Company have built a standard gauge railroad about 4½ miles long, connecting with the New York Central at Potsdam. The mill has been arranged with a view to utilizing both the above mentioned sources of wood supply. Wood from the Raquette water shed will be floated down the river and the power canal, taken out near the forebay, and carried by log conveyors to the piling ground and sawing and barking buildings on the flat ground to the north of, and about 40 feet below, the forebay. After being sawed and barked it will be taken on narrow gauge cars, hauled by a small electric locomotive, to the grinding room. The Canadian wood will be delivered, peeled, on railroad cars and unloaded either in the storehouse, located 232 feet from the power house, or in the grinder room, to which the railroad track is extended. The stored wood is brought to the grinder room by means of cars on the same track.

In the grinder room are placed two pairs of water wheels of 3000 horse-power capacity each, on horizontal shafts, supplied with water from two independent 10-foot penstocks and discharging into a common tailrace. The grinders are of the four-pocket type, with stones 54 x 27 inches, 12 in number, three on each side of each wheel, direct coupled to the same. The foundations for the grinders are of masonry firmly built, and under each grinder is a ditch faced with large, smooth stones to receive the ground stock. The front ends of the ditches are closed and provided with a drain hole in the bottom for occasional cleaning. The back end is open and has a groove cut on each side to receive the dam. From these ditches the stock flows over the dam into a wooden hopper and through the floor to a wooden spout, which conveys the stock to a large automatically cleaned screen located directly over the stock tank in the basement. Two centrifugal stock pumps, placed on a level lower than that of stock in the tank, convey the stock further through a spiral riveted pipe to a tank built on four masonry piers on the bank between the power house and the forebay. These two pumps usually work together, but in case of failure of one of them, either pump can be shut down and repaired, while the other is capable of doing the work alone for a short period. From the above mentioned tank the stock is conveyed by gravity to the screens in the wet machine room. This room is located above the grinder room and occupies the entire length and width of the building. The screens are placed near the walls and driven from two countershafts on each side of the room. Space is provided for 48 12-plate screens, placed in two rows, one higher than the other. They are coupled together in groups of six, each group driven by a separate pulley. There is room enough also for 20 wet machines provided with hydraulic pressure on the rolls and placed toward the center of the building with the press ends facing each other. The upper row of screens receives the stock, as above described, from the stock tank on the bank through a spiral riveted pipe running in the trusses above the screens, and each screen is supplied with stock independent of the other. The upper screens discharge into a common wooden trough, and this trough, in its turn, supplies the lower row of screens, each independently of the other. The lower row of screens again discharges into another common wooden trough, which supplies the wet machines. By means of these common troughs and the independent supply on the screens, any disturbance in the capacity of either a screen or a wet machine can be repaired at any time without decreasing the output seriously. All screens are provided with independent power driven rakes. When the pulp is taken from the wet machine rolls and folded it is laid on a conveyor running between the two rows of wet machines.

The return water from the wet machines is discharged under the lower row of screens, and conveyed to a tank located outside of the building, on a level between the first and second floors. From this tank the most of the return water is delivered to the grinders by gravity, though some of it is pumped back to the screens with a centrifugal pump placed by the side of the two stock pumps in the basement. The draining of the floor in the wet machine room is done through holes in the floor, one under the wet machines and one between them, connected to pipes running under the floor along the building. All tanks, screens and wooden troughs are provided with overflow, conveying the stock back to the tank in the basement.

The power for the wet machine room is delivered by means of a rope drive from water wheel No. 4 in the electric station to a main shaft running the full length of the wet machine room in the center of the building and supported by hangers bolted to a steel frame connected to the trusses. Strained fresh water for shower pipes and hose is supplied by two pumps coupled together and placed in the wet machine room. At the same place, and driven from the same shaft as the fresh water pumps is a suction pump for producing vacuum in the suction boxes on the wet machines. Another rope drive furnishes the power from the main shaft to the pumps; one branch of the drive runs down to a countershaft in the basement for the stock pump and the return water pump, and another branch to the countershaft for the fresh water and suction pumps.

The conveyor between the wet machines consists of 125 small cars fastened to a moving endless steel cable, and runs the whole length of the wet machine room, with the driving mechanism in the far end of the room. From this room it runs on an incline on wooden trusses supported by wooden bents to the storehouse and through the entire length of this building. The cars are carried back reversed on a lower track. When the pulp laps reach the storehouse they are either loaded on railroad cars placed at the side of the conveyor, or stored, which can be done to a capacity of 3000 tons.

The entire plant has been designed by and built under the personal supervision of the writer. The details of the pulp mill have been worked out by Louis De Geer, and the exterior of the power house is the design of V. Emile Thebaud, architect.

## The Andrew Carnegie Research Scholarship.

Bennett H. Brough, secretary of the Iron and Steel Institute, has sent out notices in English, French, German, Spanish, Italian, Swedish and Russian, relating to the Andrew Carnegie Scholarships for next year. Candidates, who must be under 35 years of age, must apply, before the end of March, on a special form, to the secretary of the institute. The object of the scholarships is not to facilitate ordinary collegiate studies, but to enable students who have passed through a college curriculum or have been trained in industrial establishments to conduct researches in the metallurgy of iron and steel and allied subjects, with the view of aiding its advance or its application to industry. There is no restriction as to the place of research which may be selected, whether university, technical school, or works, provided it be properly equipped for the prosecution of metallurgical investigations. The appointment to a scholarship shall be for one year, but the council may at their discretion renew the scholarship for a further period instead of proceeding to a new election. The results of the research shall be communicated to the Iron and Steel Institute in the form of a paper to be submitted to the annual general meeting of members, and if the council consider the paper to be of sufficient merit the Andrew Carnegie gold medal shall be awarded to its author. Should the paper in any year not be of sufficient merit the medal will not be awarded in that year.

The Chicago Pneumatic Tool Company of 95-97 Liberty street, New York, are reported to have secured a contract through their British representatives, the New-Taite-Howard Pneumatic Tool Company, Limited, of 63 Queen Victoria street, E. C., calling for the shipment of over $10,000 worth of pneumatic tools to be installed in the new car shops of the East Indian Railway.

# The Iron Age

**New York, Thursday, December 26, 1901.**

DAVID WILLIAMS COMPANY, - - - - - - PUBLISHERS.
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JOHN S. KING, - - - - - - - - BUSINESS MANAGER.


## The "Great Discoveries" of 1901.

As we are nearing the season when annual reviews are in order and unusual interest attaches to retrospective analyses of the progress of 12 months, it is interesting for those whose attention is focalized on the practical concerns of life to know what, from the viewpoint of abstract science, seem to be the most important contributions of the year 1901 to the sum of human knowledge. The results of this examination are likely to be disappointing to those who attach more value to inventions which play an immediate part in ameliorating the conditions of life or facilitating the world's work, than to discoveries which do not admit of profitable utilization in the arts and sciences. There is a tendency, perhaps, among those for whom life has only practical problems to undervalue abstract science; but as the tendency among original investigators is to look with little respect upon an effort to convert the nuggets of scientific discovery into the current coin of manufacturing profit, the interdependence of the theoretical and the practical exists without mutual recognition.

The president of the Royal Society, Sir William Huggins, in his annual address delivered a few days ago at Burlington House, reviewed the scientific progress of the year from the familiar viewpoint of that society, and selected two "discoveries" as more important than all the rest. One of these dealt with celestial phenomena, and the other with problems in technical education. From the wealth of material furnished by the mechanical progress of 1901 it would seem as if topics of more exciting interest could have been selected for elucidation and discussion in the annual address of the president of the foremost learned society of the world; but, as we before said, it all depends upon the point of view, and it is as interesting to know what the devotees of abstract science think about the world's progress as to follow discussions in the realm of a less rarefied atmosphere of thought.

The greatest of the year's discoveries, in Sir William's judgment, is that of the new star in Perseus, which has undoubtedly created a profound excitement in the scientific world. The evidence that there is "something doing" in the heavens on a scale of magnitude out of all proportion to the phenomena representing the orderly and normal behavior of the stars is well calculated to set the astronomers agog, even though it does not banish sleep from the eyes of those whose acquaintance with Perseus is slight and formal. The new star in that constellation flashed into visible existence in February last. Two days before it was recognized by that unwearied observer, Dr. Anderson, of Edinburgh, who was also immortalized by the discovery of the new star in Auriga in 1892, there was nothing brighter in this constellation than a star of the eleventh magnitude, as was proved by Pickering's photographic plates of that section of the heavens. When first observed, Anderson's new star was ratable between the second and third magnitudes. Within 48 hours it surpassed in brilliancy any star of the first magnitude, then it began to wane, and has since declined, with some fluctuations, to about the sixth magnitude. The announcement of its discovery operated like a fire alarm among the astronomers; and it is fortunate for those chiefly interested that never before in the history of the world were so many competent students equipped with instruments suited for accurate observations of its exciting phenomena. Those who, like Sir Norman Lockyer and Father Sidgreaves, have watched it ceaselessly and with critical intelligence, report that from the moment of its birth as a new sun it has been cooling from a state of intense incandescence, and that during this process sundry elements, known and unknown to spectroscopic analysis, have made their appearance. This is interesting. Perhaps it does not show that there are in this firey aggregation elements in gaseous sublimation which do not exist on the earth, but it may show that the terrestrial physicists have still a number of elements to find and recognize which may or not have economic value. That they will ultimately find them we have no doubt. The quaint and learned Boyle was probably right when he ventured the generalization that "there is but one universal matter of things." Whatever the spectroscope finds in the light of distant suns, since the recognition of the lines of salt in the spectrum of Sirius, has been, or undoubtedly will be, found in terrestrial gases.

Within two days of their discovery the Nova of 1892 began to show a characteristic spectrum, giving the broadened dark and bright lines of known elements, especially hydrogen—the dark bands of absorption being on the violet side of the corresponding bright lines. Remarkable phenomena occurred in both Nova Cygni and Nova Aurigæin—that at certain stages of their cooling the bright lines peculiar to gaseous nebulæ, due to an unrecognized light substance which has been called nebulum, made their appearance in connection with the characteristic lines of helium, hydrogen, &c., and remained to the latest stage of their spectra. Likewise Nova Persei, as it waned, showed a similar development of the nebular lines, and nebulum is an element for the terrestrial physicists to look for. Whether they find it or not probably makes more difference to them than to any one else.

The origin of the new star in Perseus may have been in a swarm of meteors disrupted by intense heat from plunging through nebula. Its latest phenomenon is a sort of corona around this rudimentary sun—whorls or spirals of faintly luminous matter, apparently projected from it by eruptive or repulsive force.

The fact which shares with the new star in Perseus the first place in the estimation of the Royal Society as making 1901 memorable is the *rapprochement* established between abstract science and education through the work of the British Association. Sir William Huggins does not find ground for satisfaction in the present state of the higher secondary education in Great Britain. He thinks that the classic languages receive far too little attention, and that neither mathematics nor natural science receive their fair share of attention. A great many people, even of those who are deeply interested in the investigations of those in the membership of the Royal Society, will be likely to believe that the less that society has to do with practical pedagogy the better for the schools, and that instead of deploring the inability of the nine members who received appointment upon the boards of as many public schools to exercise a controlling influence as against the "traditions of the schools," that fact furnishes grounds for congratulation. There is great room for general school reform, and no doubt it is as true to-day as it was in the time of John Evelyn, two centuries ago, that most school boys waste six or

seven years in "the learning of words only, and that, too, very imperfectly." We question, however, if the Royal Society can render any useful service in that direction.

We have called attention to these features of the address of Sir William Huggins not because of its interest for mankind in general, but because it so perfectly illustrates the lack of sympathy existing between abstract science and the practical concerns of life. A great many things have happened since the dawn of the first year of the twentieth century which have been pregnant with the potentialities of incalculable usefulness. The new star in Perseus and the futile activity of 12 members of the Royal Society in public school boards are no doubt interesting, but to think them the most interesting facts in the scientific history of a year is to show what effect breathing the rarefied atmosphere of abstract science has upon the brain and heart of humanity. The Royal Society has its place, no doubt, but it is impossible to resist the conclusion that to do something for the good of mankind and to make life happier for those who must maintain a struggle for existence is worth a good deal more than the most intimate possible knowledge of what is happening in Nova Persei, or what a few learned men may accomplish in substituting one impracticable scheme of education for another.

## Financial Legislation.

It is to be hoped that a change in the Secretaryship of the Treasury will not seriously retard the reformatory legislation of which the financial system is so much in need. And yet this is almost too much to hope for. It is seldom that one official can begin where another leaves off. But if the change in the Secretaryship of the Treasury is unfavorable to financial legislation there is the greater need that business men, individually and in their associations, should impress it upon the minds of members of Congress that the favorable conditions now existing should not be neglected and the reforms be deferred.

It happens that the most opportune time for Congressional action is when there seems to be the least need of it. To stop the purchase of silver was imperative in 1893, and because it would affect the situation there was bitter and protracted opposition to it. At the present time the complete elimination of the silver standard from the statutes would change nothing in the current conditions of business. Therefore the opposition to it would be reduced to a minimum; but for the same reason there is a very strong disposition in Congress to let the matter alone.

The report of Secretary Gage, his recent speech in this city, a speech by ex-Speaker Reed, the addresses made at the National Bankers' Association in October, and the resolutions of several associations of bankers and of merchants, leave no doubt as to the things that ought to be done. The advocates of free silver coinage were strong enough to defeat the gold standard bill of the House of Representatives a couple of years ago and to save the theory of the silver standard. The country has declared itself emphatically in favor of the single gold standard, and the Secretary should be authorized to redeem all other forms of United States money in gold. The present law is good enough when administered by advocates of the gold standard, and it is not likely that there will ever be a free silver administration; but a President and a Secretary of the Treasury favorable to bimetallism would not be very remarkable, and the integrity of the money unit ought to be beyond the influence of any administration.

The United States has redeemed the "greenbacks" two or three times over, and it is now maintaining a reserve of $150,000,000 of idle gold to insure their redemption again and again. Financial authorities are almost unanimous in insisting that these Government notes should be permanently, though gradually, retired. These notes were issued as a forced loan when the Government had a great war on hand. It has now a huge volume of money in its vaults, a revenue of $100,000,000 a year more than its expenditures, and steps should be taken at once to begin paying off permanently this debt of the Civil War, which draws upon the Treasury the burden of maintaining the value of the country's paper currency.

Whether this be begun at once or not, there is still more pressing need of a reform of the bank currency law, and this has been much more fully discussed than the other matters. The bond security is not essential to support the value of the bank notes. This has been proved by the statistics of failed national banks and the operation of the banking laws of several States before the national bank law was passed. Our experience has proved abundantly that a bank currency secured by bonds must tend to contract, because there is a decrease in the profit from the bonds. The bank note circulation of this country is small, its general tendency through a course of years is to decline, and it doesn't expand and contract with the varying needs of business from season to season.

Finally, there is the Treasury itself, which is now holding $170,000,000 in excess of what may be called the working capital of the Department. Secretary Gage has advised cutting the revenues $50,000,000, which is only half of the surplus that will accumulate during the current fiscal year. If the revenues are not reduced there will certainly be extravagance in appropriations. There is a growing conviction in the business world, reflected in an after dinner speech by Mr. Reed a few evenings ago, that the operations of the independent Treasury, the collection of public revenue and the burial of it in the Treasury vaults till needed is archaic and a menace to business, in spite of the efforts of Secretary Gage to reduce its effect in contracting the currency to the lowest terms. There is no lack of important work for the new Secretary to do.

## The Crisis in the Sugar Industry.

The sugar industry has occupied one of the most prominent positions in the business world during the past few weeks, not second in importance to any. Even the sensational developments in and the erratic movements of copper have not eclipsed the general interest in the sugar situation. The demoralization which has attended the break in the prices of raw beet sugar at London to the lowest point ever recorded and the rupture of harmony among American refiners has given birth to dramatic incidents of deep and widespread interest and importance.

The 1901-02 campaign has now progressed far enough to give assurance of the largest world's crop of sugar ever produced—over 10,500,000 tons. The European beet sugar crop, it is estimated, will fall but little short of 7,000,000 tons, and the cane sugar crop—two-thirds of which is produced in America—will show an increase of several hundred thousand tons, the Cuban crop alone being about 200,000 tons more than was produced during the preceding season.

The annual consumption of sugar in the United States is about 2,300,000 tons, or about 65.2 pounds per capita, but while we consume over one-fifth of the world's production we produce only about one-eleventh

of the world's crop, even with the aid of our island possessions. This year it is estimated that Louisiana will produce about 300,000 tons; Hawaii, 30,000 tons; Porto Rico, 100,000 tons, and the Philippines, 50,000 tons of cane sugar. Of beet sugar our crop will be less than 200,000 tons. About two-thirds of the beet sugar of this country is produced in nearly equal portions in California and Michigan, while Nebraska, Utah, New York and Colorado produce over four-fifths of the remainder.

The United States is the natural market for Cuban sugar; in fact, Cuba has no other outlet for her sugar crop, and this year the Pearl of the Antilles will produce 800,000 tons, upon which—by reason of the heavy crops elsewhere and the duty imposed by the United States—there is a prospective loss of nearly $11,000,000 for her planters.

The cost of laying down raw beet sugar from Europe governs the price that is paid for raw cane sugar imported from Cuba, and until within a few days the price has been 3¾ cents, c.i.f. New York, duty paid, for centrifugal 96 degrees test, which is the basis or standard for calculating the cost of refining. Now, however, raw beet sugar can be imported from Europe equivalent to 3.71 cents, duty paid, which means a greater loss for the Cuban producer who must meet the competition.

The system of direct and indirect bounties in force in Germany, France, Austro-Hungary and Russia is responsible for the heavy production of beet sugar in Europe. The direct bounties paid by the Governments, and the indirect bounties paid through the instrumentality of the Kartell, upon sugar exported, enables the European producer to sell both raw and refined sugar abroad at or about the cost of production, while the home consumer is obliged to pay relatively an enormous price. It is one of the greatest impositions of the age and has done more to demoralize the sugar industry the world over than anything else. This is evident when it is known that the German consumer is now paying the equivalent of 8 cents and the French consumer the equivalent of 10 cents per pound for refined sugar, which is being sold in England at 2½ cents per pound and subject to ½ cent duty.

Such is the mistaken policy of the Continental Governments which has enabled England to build up a lucrative preserving industry—to import fruit and import sugar (against the interest of her West India islands)—against which no other interest in the world can compete successfully while present conditions are undisturbed.

Fortunately, however, the European nations have awakened sufficiently to the injustice and harm they are doing their own people to agitate the abolition of the hateful bounties. It is to be hoped that the recommendations of the Brussels Conference will be speedily adopted by the various European Governments.

Because of cheap labor in the fields raw beet sugar, it is estimated, can be produced in Germany at the equivalent of 1½ cents per pound, and granulated sugar at a shade under 2 cents per pound. It is a fact that granulated sugar is being imported at New York from Germany at 2.06 and 2.20 cents in bond, or 4.38 and 4.52 cents per pound, duty paid, according to grade.

These are the external conditions to which the Cuban grower and the American refiner must adjust themselves. But while the refiner is protected by the tariff, the Cuban planter is naked to the adverse trade winds.

As the United States is morally responsible for the welfare of Cuba there seems no good reason why reciprocal trade relations should not be entered into by which the duty upon Cuban raw sugar would be modified; at least lowered enough to insure the sugar industry against loss, if it is really unwise or against domestic sugar interests to allow a reduction to a point where a profit would accrue to the planter.

Upon the best authority it is known that the cost of producing sugar in Cuba to-day is 2¼ cents per pound. Since the Spanish-American war labor has been scarce in Cuba, and wages now are the same as paid in the United States for similar service—90 cents and $1.10 in United States gold per day. Adding the cost of transportation, lighterage, insurance, &c. (0.525 cent), brings the cost of centrifugal sugar, 96 degrees test, to 2.775 cents per pound in bond, and as the current market price is 2.065 cents in bond (or 3.75 cents, duty paid), there is a loss of 0.71 cent per pound sustained by the grower, equivalent to $14.20 per ton, or $11,360,000 on the crop of 800,000 tons now being crushed.

The reduction of the duty by the United States Government, which would relieve the pressure upon the Cuban sugar interest, is opposed by the American beet sugar industry, which claims the lowering of the tariff to Cuban sugar would destroy the protection which the beet industry now enjoys and needs, as the industry is not self sustaining. If lower duties prevail, the advocates of the domestic beet sugar claim it would be the American refiners and not the Cuban growers that would be benefited. But, above all, if the growing of cane sugar is made profitable in Cuba the industry will flourish to such an extent in the island that the beet sugar industry on the American continent will cease to expand; may even die.

From the facts that can be gathered it would seem that this is a narrow view, at variance from the truth, with the fear of the destruction of the industry not well grounded.

Henry Oxnard, in 1899, claimed that granulated sugar could be made from beets grown in the United States at 2.80 cents per pound, based upon beets at $4 per ton; other expenses, $3 per ton, and a yield of 250 pounds of sugar to the ton of beets. It is claimed now, however, that the average price paid for beets is $4.50 per ton; that the expenses incurred in manufacturing, labor, material, &c., are $2.50 per ton, and that for depreciation of machinery, interest, &c., $1 per ton should be allowed, an aggregate of $8 per ton. It is also claimed that the yield of sugar has been reduced from 250 to 220 pounds to the ton. On this basis the cost of producing refined sugar from beets would be about 3.60 cents per pound. The cost of producing refined sugar from Louisiana cane is given at 3 to 3½ cents per pound. The cost of producing refined sugar from Cuban raw sugar (subject to duty) is 4.15 cents per pound, allowing 0.40 cent per pound as the cost of refining.

These figures indicate that sugar refined in the United States, whether made from beets or cane, is protected to the extent of 0.35 to 1.02 cents per pound, according to conditions, against competition from foreign refined sugar, which should be ample. Indeed, the large profits made, dividends disbursed, and the market value of the stocks of the companies making sugar, from either cane or beets, would indicate a handsome margin on the capital invested.

It is the Cuban industry which is languishing and needs help; and the aid if extended will not adversely affect domestic interests, as the United States would

merely remit a part of the duty, which amounts to $26,960,000 upon 800,000 tons of raw sugar.

The demoralization which exists in domestic refining circles at the moment is largely due to local causes, keen and even destructive competition, resulting from the violation of confidence among dealers and refiners from envy and jealousy, as well as in sympathy with unsettled conditions abroad.

## Canadian News.

### American Enterprise Looking Toward Canada.

TORONTO, December 21, 1901.—The idea of establishing large locomotive works in Canada has been put forth during the last week. A party from New York, of which a Mr. Arkell appears to have been the chief spokesman, arrived in Montreal a few days ago, and had much to say about the prospects of such an industry in this country. Mr. Arkell, who is represented by Montreal newspapers as a director of the American Locomotive Company, is quoted by them as being very optimistic concerning the outlook for the manufacture of locomotives on this side of the line and as being interested in a project to establish big works here.

G. R. Denham, vice-president of the American Palace Car Company, was a member of the party. Mr. Arkell and his fellow travelers went on to Kingston, Henry Folger of that city accompanying them. The latter is a prominent man in Kingston, and is interested in iron ore properties not far from there.

According to a statement given out at Kingston an offer was made for the locomotive works there.

American capital is also interested in an enterprise which is being started up in Hamilton, Ont., for the manufacture of wire, of nails and the lines usually associated with the production of these. The capital stock is $200,000.

### Checking the Bounty Earnings.

The Deputy Minister of Trade and Commerce and the Auditor-General returned from Sydney last week, where they had been studying the question how to supervise the output of the steel works so as to ascertain the exact amount of bounty due. The checking of the amount of pig iron produced offers no obstacles. That business has been long enough established in Canada for a workable system to have been arrived at by the department. But the Dominion Iron & Steel Company are now almost ready to start the manufacture of steel on a large scale, and the amount of bounty invested is much greater than ever, and the task of keeping a check on the company's reports of output is much more complicated. When the ten open hearth furnaces are in full operation 1000 tons of steel will be produced daily. At this rate the company would earn in steel bounties $1,000,000 per annum. On the pig iron the bounty earnings would amount to at least $750,000. Of course, such large sums could not be paid out with the approval of the Auditor-General unless he had every assurance that every cent of it was fairly due the company. The question also arises whether scrap resulting from the company's operations should be paid for when used over again to manufacture steel. On steel, 50 per cent. of which is scrap, the company are entitled to the bounty. The Deputy Minister of Trade and Commerce and the Auditor-General, however, are inclined to draw a distinction between scrap purchased by the company and scrap resulting from any of their own processes of manufacture. But the company cannot see why such a distinction should be drawn. It is probable that a representative of the company will be asked to come to Ottawa and consult with the Government in regard to the difficulties raised. The Government is desirous of facilitating, as far as possible, manufacturing operations, and of studying the convenience of the company. But it feels bound to exercise every possible means of supervision in the public interest.

### New Managing Director at Sydney.

James Ross, under whose management the Dominion Coal Company were placed a few months ago, has been appointed managing director also of the Dominion Iron & Steel Company. Since he took a more active interest in the coal company increased confidence in the prospects of that corporation has been signified by a greater readiness on the part of Canadian investors to buy their shares. A like improvement in the business of the steel company is expected as the result of his appointment.

The fact that Mr. Ross had been appointed to a place in the management of both the coal company and the steel company gave rise to a repetition of the old rumor that the companies are about to be amalgamated. Mr. Ross, however, denies that there is any intention of amalgamating them. His appointment does not, it is stated, affect the position of Mr. Whitney as president or that of Mr. Moxham as general manager, save to relieve the former of some of the executive details.

### No Shipbuilding at the Sault.

The report that a great shipbuilding plant in which Sir Christopher Furness and F. H. Clergue should be interested would be built at Sault Ste. Marie is publicly denied in a letter given to the press by the latter.

### A Rifle Company.

Notice has been given that application will be made to Parliament at the next session for an act incorporating a company under the name of the Ross Rifle Company, Limited. Their capital stock is to be $3,000,000. The rifle to be manufactured is that invented by Sir Charles Ross, with whom other capitalists will be associated in this company. It is stated that the company have already a contract to make 50,000 rifles for the Australian Government. Orders from the Imperial Government and the Dominion Government are also being sought and expected. The Ross rifle was tested in Canada last summer by a commission of experts, consisting of Col. Hon. J. M. Gibson, Lieutenant-Colonel Anderson, Lieutenant-Colonel Cartwright, Lieutenant-Colonel Hughes and Major Gandee. It is thought probable that the Government will select the location of the factory.

### Minor Notes.

A company are reported to be in course of formation to establish rolling mills in Sydney, Cape Breton.

The Halifax *Chronicle's* Sydney correspondent says that the rails of the Cape Breton Railway Company's proposed line between Sydney and St. Peter's and between Sydney and Louisbourg will be provided by the Dominion Iron & Steel Company.

W. J. Hill, M.P.P., arrived in Toronto a few days ago from Sault Ste. Marie, where he has a contract in the work of constructing some of the buildings of the Clergue industries. He says the steel plant is well advanced, and that 8000 to 10,000 tons of pig iron are on the ground ready to be converted into steel. C. A. C. J.

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The Glasgow Exhibition was opened on May 2, and continued until November 9. During that period 11,497,220 persons attended, a total which, it is stated, has never before been reached by any exhibition in England, and which was double the attendance at the previous exhibition at Glasgow in 1888. The highest attendance was on the closing day, when 173,266 passed through the turnstiles, while the highest number previously achieved by any exhibition in England was at the 1888 exhibition at Glasgow, when the total, again on the closing day, reached 117,901. At the exhibition in London in 1851 the highest number of admissions was 109,760. There were 24 days when the attendance at Glasgow exceeded 100,000, and on three days only did it fall below 40,000. The total money taken at the turnstiles, excluding, of course, season ticket receipts as well as railway coupons, was £167,877.

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The excellent condition of the business interests of Chicago is forcibly demonstrated by the experience of one of the largest owners of manufacturing and warehouse property in the city. He says that in 12 years' experience he has never seen such an enormous demand for manufacturing or warehouse facilities, having numerous inquiries for space which cannot be considered. He finds many parties seeking capitalists willing to construct buildings for their use on a percentage basis.

## Notes from Mexico.

**Investments and the Falling Peso.**

DURANGO, December 18, 1901.—The fall in value of the Mexican peso, which bears so hard upon the importer, is not without compensating advantages. The American investor with a moderate gold capital when he turns to the Mexican field finds himself in a position to engage in business enterprises of much larger promise and greater magnitude than he could possibly have done with the same amount of capital in his own country. With each of his gold dollars bringing him a premium of from 130 to 132 cents, he is apt to feel that a free silver system of currency, when it works his way, may possibly not be wholly irrational. Of course it does not always "work his way," for there is little scope for the foreigner's operations in a partially developed country which does not entail commercial relations with the people of neighboring lands, whose products in one form or another he must purchase in order to make his efforts successful. When the people with whom he trades do their business upon a gold basis it is in the settlement of accounts thus contracted that the question of a high rate of exchange comes to haunt him. But even this burden is only occasional and of temporary significance, while his advantages are permanent, providing the sphere in which he has elected to employ his capital and his energies has been well chosen.

**New Enterprises.**

That acute business men appreciate the opportunities which Mexico offers for investment of their capital is proved by the almost daily announcement of some great undertaking, for the lack of which the country's development has been in a measure retarded or the business world has suffered. A new and important venture, somewhat out of the beaten track, but of great profitable possibilities, has recently been launched, in which American and Mexican capital is invested. This is a company with a share capital of $2,000,000, divided into 20,000 shares of $100 each, whose object, according to the articles, is "to exploit two contracts which they have executed with the federal executive" for the establishment of general bonded warehouses in the City of Mexico and in Vera Cruz. The share capital has been all subscribed and 50 per cent. of its nominal value paid up, as required by law.

A concession has been granted for the establishment of a gas making plant in Monterey. The Loomis-Pettibone Company of New York City will build it. It is said that $500,000 will be invested in the enterprise. It is the company's purpose to supply gas both for illumination and for fuel.

The banking facilities of the capital have lately been augmented by the addition of a trust company with large capital and by a private bank, the latter being under the management of a former associate of the leading American financial institution doing business here. The cosmopolitan business interests of the community seem now to be well taken care of, several diverse nationalities being represented by their own banking establishments.

**The Projected Exhibition of American Manufactures.**

The proposed exhibit of American manufactured products in the City of Mexico, referred to in a previous note, seems to have hung fire. Whether this has been the fault of the American manufacturers themselves or of their local agents cannot be said. The project has been mooted for some time past; in fact, the 24th of the present month was fixed upon as the opening day. Local committees have been formed, however, and it is hoped that the idea will yet be carried out, and in even a more ambitious way than was at first intended. The plan has now been amplified and a permanent, instead of a temporary, exhibition of local and imported products is being agitated. A concern with the title of the Mexican Permanent Exhibition Company, Limited, with a capital stock of $300,000, have been incorporated to carry out the idea. The terms of the concession require the company to erect buildings for the display of the goods and to keep them in repair at their own expense. Not less than $300,000 is to be invested in the site and buildings. The exhibition when opened must contain "as complete a collection as possible of the industrial, mining and agricultural products of this republic, as well as similar products of foreign countries, and of manufactured articles of all lands."

St. Louis people, apparently discouraged by the obstacles encountered in organizing an exhibition in the City of Mexico, are promoting an American manufacturers' exhibit in Guadalajara. J. J. D.

## The Grand Jury and the Brooklyn Bridge.

It will be recalled that after the accident to the Brooklyn Bridge last summer the District-Attorney appointed two experts to examine the structure and report upon its condition. That report, which was published in *The Iron Age* at the time, pointed out certain overloaded parts, made recommendations to increase the safety and flatly condemned the management which had utterly failed to make examinations which are customary in engineering practice. The matter was then handed to the Grand Jury, who have just made the presentment, which is, in part, as follows:

The Grand Jury find from the evidence before them that the New York and Brooklyn Bridge has been never regularly or systematically inspected, and that its management in this regard has by no means been in accord with that which would naturally characterize its management had it been private property under the control of a good business man charged with responsibility for its safety.

Methods of inspection well known and even common among bridge engineers have been wholly omitted, and we are satisfied that if the bridge had been periodically subjected to a proper systematic inspection such accidents as that of July 24 last (when nine suspension rods were found to be broken) would have been avoided.

We further find that during that period under consideration such inspection of the bridge as did take place was made by carpenters, riggers, riveters and such mechanics, wholly undirected and uninstructed as to methods by any engineer, and that, too, at no stated times and at no regular intervals, and that their so-called inspections did not in any case include a comprehensive inspection of the bridge as a whole, even by such methods as might suggest themselves to these mechanics.

Though the evidence before us tends to show culpable neglect in this regard, in the management and maintenance of the bridge, yet in view of certain extenuating circumstances, which, however, will not hereafter apply, this neglect is not, in our opinion, of the character designated by the statute as "willful," or such as to demand the present indictment of those responsible for such management. . . .

The Grand Jury, accordingly, respectfully recommend:

1. That as soon as is reasonably possible there shall be made, by or under the immediate direction and supervision of a competent engineer, a more rigid and complete inspection of the entire structure than was possible, in the limited time at their disposal, for the engineers examined before us, who are not regularly connected with the bridge.

2. That the future management of the bridge shall require similarly rigid and complete inspection by the best methods, at stated and frequent intervals; that such inspection shall be made by or under the direct supervision of a competent engineer, who shall be responsible for the thoroughness and completeness thereof and the sufficiency and accuracy of the written reports of the same, which he shall be required to make as each inspection proceeds; that those parts of the bridge in which any break or disarrangement has occurred or may occur, and which are vital to the safety of the bridge, be watched with the greatest care and frequency, so that upon the first appearance of a defect or break the same may be immediately corrected and prevented from extending. In

our opinion proper inspection would require practically the entire time of such engineer.

3. That some system of regulating the traffic on the bridge be adopted in order to avoid special strain at any one point, such as resulted in the buckling of the lower chords of the stiffening trusses on an occasion prior to the accident above referred to.

## President Schwab Explains Modern Consolidations.

Charles M. Schwab, president of the United States Steel Corporation, was the chief speaker at the banquet of the Bankers' Club of Chicago on the evening of December 21. His address, as reported in the Chicago dailies, is as follows:

I notice that I am down on this card to respond to the toast, "The Natural Growth of Business Enterprises; the Consolidations Thereof." I have been thinking a little about this and had some notes prepared to speak on the subject of consolidations here in Chicago, but when I picked up the evening paper I saw two things that particularly struck me. The first was that the colleges in this vicinity had combined—Presbyterian colleges, I think.

Could there be a stronger argument as to the good that comes of consolidation than that these staid college professors, with all their thought, had decided that it was to their advantage to combine their colleges? What were they going to combine for? They were not going to combine for the purpose of making education more expensive to the students, that is evident. But they were going to combine for mutual protection and information and good.

Now, that is just the basis on which great business enterprises have consolidated. The trust of old is a mistaken idea. The consolidation of to-day is the proper policy. It has been borne out in everything, even in Genesis, and so on down. The rivers combine to make the great seas; the trees combine to make the forests. Combinations have gone on in nature forever, and they will go on in politics and business.

### Consolidation is Natural.

You might just as well try to dam the Mississippi or sweep back the tides as to stop the natural consolidation of business interests. You may regulate the commerce of the Mississippi as you will, and I think its course ought to be regulated by wise and judicious legislation, but you cannot stop it. It will go on in spite of everything.

Now, the old trust idea was just as fallacious as anything could well be. In the first place, it was founded upon the principle of restricting the output or increasing the prices or in some other artificial way regulating the business. That is doomed to failure.

The proper business consolidation is one that is formed with exactly opposite views. It is formed with the view of encouraging trade, of enlarging trade, and, above all, of cheapening the production of the article of which it becomes the manufacturer, and in that way increasing the trade.

Now, it is difficult for me to exemplify this without pointing to some instances, and naturally I am apt to select that instance with which I am most familiar. I am not going to talk stocks or values. You couldnt get me to do that. But I hope you will pardon me if I refer to an industry with which I am connected. I only refer to it because I am most familiar with it and because I think it typically represents the idea of the great consolidations.

### Says Steel Is King.

The great steel industry of this country is now first of all. A few years ago cotton was king. King Cotton is now dethroned and King Steel has taken his place. The steel industry last year, to the best of my knowledge, exceeded the cotton industry by more than $100,000,000, and this year it is our belief that the steel industry will exceed the cotton industry by more than $250,000,000, so that I think steel is justly entitled to be throned and crowned.

The advantages I will very briefly refer to as showing you an ideal consolidation. These great steel companies were not put together with the view of avoiding competition, because, except in very rare instances, they were engaged in different lines of business. But they were put together for the purpose of cheapening and strengthening the steel products and developing the interests of this country.

In the great Northwest, where we have all those ore mines, each individual company could not own the particular mine that would enable them to make the best mixture for the respective qualities of iron and steel, but by consolidation of all these interests it was possible to group these mines as one, to take the ores from the various mines to the works best suited to make the ideal mixture, to do it at the least cost and to produce the best article.

So in transportation. Instead of a small fleet, whose steamers would have to wait at the docks for loading and unloading as suited their respective owners' works, they now come down in rotation. They are loaded and their cargoes are not assigned to the various works until after they are well down on the lakes. Now, any one familiar with the shipping industry will appreciate at once the great saving in economy in such a method of operation.

So now the mills that formerly made a dozen products run continuously on one. The result of that is cheapening the product in every line, of making the steel available for many purposes for which it is not available at present and the idea of business consolidation has been reached.

Now, to come to the second part of my remarks, and that is this: The two things about the United States Steel Corporation that seemed to be best known and most generally discussed were, first, their capitalization, and, second, the salary of their president. Of the first of these I am not afraid to speak. Of the second, I am a little like our Hebrew friend in New York, who when asked what he would do for $10,000 said he was ashamed to tell.

### Owe Duty to the Public.

Now, these great consolidations owe a duty to the public. I am in hearty sympathy with President Roosevelt when he says that publicity is the thing that we require in all things pertaining to great industries. I second that proposition most heartily. The great combinations of capital that are not formed on a basis that will permit of a publication of their affairs are founded on an erroneous assumption, and I am not with them.

There are many other advantages to the public in these great consolidations. The steadiness of business and the control largely of business within their power, will be well understood by the gentlemen here if they stop to reflect one moment upon present business conditions.

In years gone by if you have looked at a diagram of fluctuations in prices you have found it a series of valleys and peaks. These great consolidations will keep that on a level. To-day the demands for steel are so great that an individual concern would undoubtedly have put the price 20, 30 or even 40 per cent. higher than it is to-day. What would have been the result? People with enterprises in their mind would have hesitated and would have said: "Wait, we will buy it a little cheaper later on."

### Paints a Dark Picture.

What would have been the result of that? Construction would have been stopped. Builders would have waited for lower prices; railroads would not have extended until they could have done better, but now we believe we are getting the confidence of the public in that respect. The result will be that building will go on. Railroads will be built and business generally will be on a more permanent and level basis.

Now I am the most enthusiastic man in the world upon the future of American industries. I believe that we are on the very threshold—I don't believe that we have reached the summit by any manner of means.

I first became identified with the steel industry in the year 1879, and I remember very well that we prided ourselves—the whole United States—upon having produced about 600,000 tons of steel. In the year 1895 there

was produced about 6,000,000 tons of steel, and in this year just ending, as nearly as we can estimate, there will be produced about 15,000,000 tons of steel in the United States.

Now I come to the last and most important part of my subject, and that is the relation of these great consolidations to labor. That is the subject that is nearest my heart. It is the subject of most importance to the welfare of this great United States.

**Compare Two Nations' Labor.**

I see some of my good English friends here present. I had intended to modify somewhat what I was going to say in that respect, but I know they will be glad to hear it. I was asked by the British Iron and Steel Institute a short time ago to tell them why the English Steel industry did not compare with the American.

There are two reasons, I told them. The first is that the attitude of your labor in England will never permit you to run your mills and factories as we do in America.

You will be surprised when I tell you that a careful survey of the whole field would seem to show these facts, that the English laborer receives on an average less than one-half of what the American receives year in and year out; that notwithstanding that fact the costs, which I have been able to compare with the American costs, have been nearly double, solely by reason of the attitude of the combination, the trust of labor that predominates in England.

It was my pleasure to speak a short time ago before a lot of labor people we brought together for the purpose of settling these questions in New York, and I said this thing, which I think is fundamentally true: "I am in favor of labor unions. I am not opposed to labor unions, as many people think. I favor them—when properly organized. I am opposed, and decidedly opposed, to labor unions where they have as their basis the restriction of output."

**Calls Attention to Wages.**

There is another mistaken idea about this labor question. Many people, speaking of the capitalization of the steel industry, refer to its great bond issue, but I would like to call attention to this fact—that the laborers are the people who have a first mortgage on this great property. We pay out in round numbers $160,000,000 annually for labor. That is the interest on $3,000,000,000 of capital that must be paid before a penny of the interest on those bonds can be paid.

Gentlemen, I stand here and say that we are not going to have any disagreement with labor over the fair return they ought to receive. We will be more than liberal with them in that direction, but we insist that we shall be treated with equal fairness; that we shall manage our works as we see fit and shall not be controlled by a trust that will regulate the output of their labor.

We want the men to stand upon their own merits. We want the good men to come forward and we want the poor man to stand still, and that is as it should be. Many organizations insist that all men shall be leveled to the standard of the poorest, and that is on the wrong basis.

Now, I am going to tell you the most serious thing, to my mind, in regard to the future of the great organizations of capital. The great business enterprises of the past have been built up by the individual interest and individual efforts of certain individuals. If you will look back over the great businesses that have been built up you will find that they have been the result of some one great mind, which has had all his interest in that business, who has had all his mind in that business—in other words, who has had all his eggs in that basket.

The result of that individualism was great progress, great extensions, great economies and great successes. The difficulty with these great combinations of capital is going to be to get people to manage them.

**Will Make Employees Partners.**

Now, I believe that difficulty can be met, and the way we intend to try to meet it is this: It is the intention of the United States Steel organization to put every man in charge of a litle branch of business, even a department of business, not on a salary, but on a percentage of the profits, which will be paid to him in cash and which he can invest in the securities if he wishes, and in that way get his individual effort upon his individual work.

We don't believe that we get that from salaries, but we do believe that we can come as near making a man a partner in that direction as in any other way that has yet been devised, and, commencing with the first of the coming year, it is our intention to operate every one of our great departments on that basis.

We shall be glad at your next annual banquet, if we have the privilege of attending, of telling you the result of that experiment.

## Industrial News from Worcester, Mass.

WORCESTER, MASS., December 23, 1901.—The machine shops are again rushed to their fullest capacity, and from the appearance of things orders short of six months' delivery will soon have to be refused. The depression of the spring and summer has entirely disappeared. This is true not only of the large shops, but of the smaller concerns as well. The general promise is of an even bigger business than that of two years ago.

The great difference is that the number of foreign orders is comparatively small, especially orders from Germany and Russia, where business is not up to the standard, which is one reason. Another, and as important, local manufacturers say, is that the market of the Continent has been pretty well stocked up with American machine tools.

The rush of orders is from the United States. Inquiries and orders received indicate that the demand is general all over the country. It is a very healthful condition of things, without a suggestion of abnormal boom about it. Some of the orders are really large, but the general run is for smaller lots.

The Prentice Bros. Company are about to ship to the shipyard of the Fore River Engine Company, at Quincy, Mass., one of the two biggest radial drills ever built. The first was built by the company eight years ago for the Pennsylvania Railroad Company. The new drill is a duplicate of the first, excepting that it is electrically driven and has a few minor improvements. Its purpose is to bore armor plate and other heavy parts of the two battle ships and two armored cruisers building by the Fore River Company for the United States Navy. The drill is a giant. Its weight is 34,000 pounds. Its total hight is 16 feet 6 inches. Here are some of its other dimensions: Vertical traverse of saddle on column, 53 inches; vertical traverse of spindle, 20 inches; diameter of spindle, 4 inches; minimum distance, column to center of spindle, 36½ inches; minimum distance of trunnion bearing to center of spindle, 18¼ inches; traverse of head on arm, 43 inches; maximum distance of spindle to base plate, 96 inches; minimum distance of spindle to base plate, 23 inches; size of table, 60 x 42 inches; hight of table, 24 inches; length of available space, base plate, 7 feet 3 inches; width of available space, base plate, 4 feet 6 inches; length of base plate, 12 feet; width of base plate, 4 feet 6 inches; thickness of base plate, 9 inches. A 15 horse-power motor is directly attached to the drill.

The Prentice Bros. Company have just shipped two large radial drills to the Moran Bros. Shipbuilding Company of Seattle, Wash. The company conduct large shipyards on Puget Sound. The Prentice Bros. Company have ordered a number of new planers to increase that department of their machine shop.

The American Diesel Engine Company prove to be a reality. The long unoccupied shop of the International Power Company, formerly the shop of the American Wheelock Engine Company, on Southgate street, will be immediately occupied for the purpose of building the engine, the American patent rights for which the company control. At the Southgate street plant a 60 horse-power Diesel engine is being installed, which will operate the plant until there is demand for larger power, when supplementary engines of the same type will be added, one claim for the engine being its economical operation as

comparatively small units of power. W. McDonald of San Francisco has been engaged as superintendent of the plant. He is now in Germany studying combustion engines with the purpose of getting acquainted with the latest ideas on the subject, especially the latest ideas in the Diesel type of engine. Germany has progressed more rapidly than any other country in engines of the combustion type, it is said by the Diesel people, and they believe Mr. McDonald will be able to get some valuable information to be applied in the process of Americanizing the Diesel machine, as Edward K. Hill, chief engineer of the International Power Company, expressed it to the correspondent of *The Iron Age*.

Two engines of this type are in operation at the Corliss Engine Works of the International Power Company, at Providence, R. I., and two more are being installed there. The engine has been found by this company to be economical in fuel consumption, using crude oil in its cylinders, and the Rhode Island Locomotive Works as well as the Corliss Engine Works will be fully equipped with this type of engines as soon as enough of them can be obtained.

The American Diesel Engine Company have placed large orders for machine tools, including a considerable order for lathes of the F. E. Reed Company of Worcester. Altogether, $50,000 will be expended in putting the Worcester plant in shape for building the engines. There is delay in delivery of tools, because of the rush of orders at all the machine shops of the country, but some of the new machinery has already been delivered, and in a few weeks it is expected the shop will begin work on its special tools, which will be needed in the operation of the industry. By spring it is believed that 100 persons or more will be employed. For the present the castings for the machines will be furnished from the Providence foundries controlled by the International Power Company, but as soon as the Worcester business has grown to respectable proportions a new foundry will be built on land owned by the company adjacent to their plant here.

Two large additions will be built at once at the South Works of the Washburn & Moen department of the American Steel & Wire Company, at Quinsigamond. Both are additions to the Ballard street building. Most of the new space will be devoted to storage purposes, though manufacturing may be added later on. One addition will be two stories, 40 feet in hight, and 50 x 68 feet on the ground. The other will be 128 x 32 feet and one story high. Both will be of wood.

The business at the wire mills of Worcester and vicinity continues better than ever, considering the season, which is generally poor at this time because of the stock taking by jobbers and retailers all over the country, which induces them to keep their stock at a minimum. Nevertheless the Washburn & Moen department is running full, with hardly any abatement. Recent readjustments of wages and the increasing of the general efficiency of the plant has led to sensational newspaper stories of cut downs of wages and reduction of the number of men employed, which are entirely without foundation. These readjustments are in progress most of the time in all big establishments in the continuous attempt to bring costs to the minimum.

The smaller wire concerns are equally busy. In fact, everything in the iron or steel line in Central Massachusetts is rushed with business.

The United States Power & Mobile Company, who have been doing business in a very small way in Worcester for the past six months, have rented a factory in Westboro, Mass., and will hereafter be located in that town.

The Niagara Falls plant of the Norton Emery Wheel Company are running full blast, and many carloads of the artificial corundum manufactured by the electrical energy of Niagara Falls have been delivered at the works in Worcester and have been converted into corundum wheels. There is a large demand for this artificial corundum from other manufacturers of abrasive wheels, and it has proved to be even better than the natural product, because of the uniformity of its quality.

The new engine house for the Merrifield engine, which provides power for a considerable manufacturing district of Worcester, is now well on toward completion. The old building was partially destroyed by the fire which burned the adjoining buildings to the ground. The new building will be 60 feet square, 18 feet high, with flat roof. It will house the 1000 horse-power engine and the four big boilers.

The Worcester Gas Light Company have issued new stock, which will provide $175,000, a considerable part of which will be devoted to improving the company's plant. New machinery has been installed at the generating plant, and it is understood that a portion of the new capital will go toward more machinery.

The Graton & Knight Mfg. Company of Worcester have declined to enter the combination of manufacturers of leather belting, which has advanced the price of their product.

Worcester manufacturers are worrying about their supply of bituminous coal, and the coal dealers are even more anxious because they are under contract to supply the manufacturers at prices ranging from $3.50 to $4 a ton. They see little hope ahead of getting coal at Worcester at less than $6 a ton, and probably the dearth of coal at the pockets of Norfolk, Philadelphia and Newport News will make it necessary to supply inferior grades of coal to be burned under shop boilers. The shortage of cars to get the coal from the mines to the seaboard is blamed for the existing famine. A blizzard or freeze up of Northern harbors would make matters even worse, and they are sure to be bad enough even with an open winter. The Washburn & Moen department is safe, however, for it has on hand a very large supply of coal.

The Worcester Electric Light Company have awarded to the Washburn & Moen department a contract for more than $80,000 worth of copper wire for use in putting the wires of the company underground.

The Globe Corset Company are building a large addition, and will put in 100 new machines to increase their product.

The William H. Burns Company have ordered 400 new machines for use in the manufacture of underwear. The company have nearly completed a big addition in which the new machinery will be installed.

The Hobbs Mfg. Company, manufacturers of paper box machinery, have taken very much larger quarters on Union street, having secured the lease of three stories of a large building. The new plant will be equipped for building a new machine.

Charles Ladd, formerly of Portland, Maine, is about to establish an extensive window screen plant in Worcester.

The Imperial Mfg. Company are another new Worcester industry, with a plant at Greendale, organized to manufacture the Up to Date can opener, for which orders amounting to 10,000 are already received.

The Draper Machine Company of Hopedale, Mass., have been given the largest order ever received by them, and one of the largest orders for looms ever received by an American concern. It is from the Grosvenordale Company, and calls for not less than 2200 nor more than 2500 looms of the woolen type. The Draper Company's shops have been greatly enlarged of late by the building of a large foundry and machine shops, more than doubling the company's capacity. The Grosvenordale Company operate mills at Grosvenordale and North Grosvenordale, Conn.

The wire goods business, which is an important industry here, is picking up. As was stated at the time in the Worcester letter of *The Iron Age*, the business for some apparently unexplainable reason was very dull during the early fall. Now it seems to have taken a decided turn for the better, and the factories are working full with plenty of orders ahead or in sight.

The Washburn & Moen department of the American Steel & Wire Company is much interested in the tests of the Brown segmental gun at Sandy Hook Proving Station, because the wire with which the gun is wound is manufactured at the Worcester plant. The last test described in *The Iron Age*, which resulted in the destruction of the breech block, but with no injury at all to the wire wound segmental tube, caused considerable elation, because it was considered a decisive test of the pow-

er of the specially drawn square wire. This wire is drawn with the greatest exactness, and is tested throughout its length to a very small fraction of an inch. It must exactly fill the space allotted it on the barrel of the gun, the deviation of the smallest fraction of an inch at either end rendering the wire covering dangerous.

## PERSONAL.

Thomas B. Adams has resigned his position as assistant treasurer of the American Smelting & Refining Company, to take effect on January 15, 1902. Mr. Adams was for eight years acting treasurer of the Consolidated Kansas City Smelting & Refining Company, and has been assistant treasurer of the American Smelting & Refining Company since their organization. Mr. Adams' plans are indefinite, but it is understood that he anticipates re-establishing himself in the banking and brokerage business. He was for several years a member of the Stock Exchange, and was a member of the well-known firms of Lawson, Adams & Co. and Adams, Kellogg & Mason.

Edgar S. Cook, president of the Warwick Iron Company of Pottstown, Pa., has been granted by the directors of his company "a vacation of six months or longer, at his pleasure." Mr. Cook will sail for Liverpool on the "Celtic," and will visit France, Germany, England and possibly Belgium. During his absence N. B. Wittman, formerly manager of the E. & G. Brooke Iron Company, will serve as acting general manager, assisted by Mr. Cook's son.

William Deering, the founder and head of the Deering Harvester Company of Chicago, has retired from business, after an active connection of a third of a century with the company, owing to advanced age and failing health.

Among the passengers on the French liner "Savoie," which arrived on Saturday, December 21, were Baron Maurice de Lagotellerie and M. Lazare Weiller, who have come to this country to study American industrial conditions. M. Weiller is a Councillor of the Committee on the Foreign Commerce of France and a member of the Colonial Supreme Council of the Republic.

W. T. Jones has resigned his position as master mechanic with the Dominion Iron & Steel Company, Sydney, Cape Breton.

Beryl Preston, who was injured in an automobile accident at Yonkers a few days since, is doing well.

At a meeting of the Board of Directors of the Wheeling Board of Trade, held in Wheeling, W. Va., on Friday, December 20, J. F. Adams resigned his position as secretary, to take effect January 1, and on that date he will assume the duties of a very important position. The directors of the Wheeling Board of Trade adopted resolutions commendatory of the services rendered by Mr. Adams during his term as secretary. He was unanimously elected a member of the Wheeling Board of Trade. George A. Laughlin is president and B. W. Peterson treasurer. A successor to Mr. Adams as secretary will be elected in a short time.

Samuel E. Moore, the well-known accountant, for many years auditor of the Carnegie Steel Company, has been appointed auditor of the Pressed Steel Car Company.

P. F. McCool has resigned his occupation with the Pressed Steel Company, effective January 1, and will connect himself with the Standard Steel Car Company, who will build a large plant in Pittsburgh for the manufacture of steel cars.

George Westinghouse of Pittsburgh has returned from Europe.

The imports of merchandise into the United States in the 11 months ended November 30 show an increase of $39,972,100 over those for the corresponding period of last year, while the exports show a loss of $3,562,871. The value of the imports for the months mentioned was $800,424,607 and of the exports, $1,328,493,371, and the balance of trade in favor of the United States in that period was $528,068,764.

### Boston Gear Works Making Standard Involute Cutters.

The Boston Gear Works of Boston are now prepared to furnish standard involute cutters for the teeth of gear wheels. All gears of the same pitch cut with these cutters are interchangeable. The cutters are made in diametrical pitches from 2 to 120, the diameters being from 5 to 1¾ inches. All are made with relieved teeth, to allow for regrinding without changing their form.

**The Carlisle Chain Works.**—The report was printed in *The Iron Age* that the Carlisle Chain Works were to be removed to Lemoyne. This is not correct, the Standard Chain Company of Pittsburgh, the owners of the Carlisle Chain Works, having no intention of removing the plant.

The large steel rail mills being erected at Sault Ste. Marie, Ont., by the Clergue interests are fast nearing completion. The American Bridge Company are erecting the roofs, and as soon as these are on the rail finishing machinery, which is all on hand, will be installed and work commenced. The two large charcoal blast furnaces will be ready next year, also wood carbonizing plants of the latest by-product saving type, which are now under course of construction. The latest development in the enterprises at the Sault is stated to be the erection of a large saw mill by the Consolidated Lake Superior Company to furnish material for the pulp and sulphite mills now in operation. It is said to be the intention of the company to use the refuse from this mill as the exclusive fuel for the rail mills.

Charles M. Hobbs, inspector of the electrical department of the Baltimore & Ohio Railroad, has issued an illustrated circular giving an account of the strange behavior of flexible bonds used on the belt line of the Baltimore & Ohio Railroad in Baltimore. The bonds were covered by the angle bars at the rail joints, there being sufficient clearance to prevent crowding the bond. Under the severe conditions of service the metal of the bond at a very large number of the joints squeezed out over the top of the angle bar and below the head of the rail. The metal is forced out in irregular sheets about 0.005 inch and over in thickness. In some cases these ribbons are 8 or 10 inches long, and in others four or five strips are forced out. The metal ribbons are formed on both sides of the rail and occur mostly on tracks of the heaviest train service, although the same action has taken place on the other tracks. No explanation is offered of this peculiar action.

The Maryland Steel Company are building at their yards at Sparrow's Point, Md., two large boats for the Boston Towboat Company, one of which, the "Shawmut," is nearly ready to take the water. These vessels are the largest constructed so far at the Sparrow's Point yards. The "Shawmut" is 505 feet in length, and 58 feet beam, and will have three steel decks. Her total carrying capacity is estimated at about 10,000 tons. She will be placed in service as an American "tramp" steamship, joining the fleet owned by the Boston Company, which have been built at the same plant. The "Shawmut" will have engines capable of producing 5000 horsepower, giving her a speed of from 12 to 14 knots an hour.

There is to be built at Hoboken, near Antwerp, Belgium, a plant of six blast furnaces of 350 tons capacity each. The works will be owned by the Société Anonyme des Hauts-Fourneaux d'Anvers.

The Rutland Railroad Company of Rutland, Vt., have placed orders for 12,000 tons of 80-pound steel rails, to be delivered early in the spring.

# MANUFACTURING.

### Iron and Steel.

The Kokomo Wire & Nail Company, Kokomo, Ind., report progress in the construction of their rod mill. The building is under roof and the machinery is now being put in place. It is expected that the mill will be ready to operate by the middle of February.

Thomas P. H. Whitelaw is forming a rolling mill company under the name of the Oakland Steel Works at East Oakland, Cal. The works will be designed to roll sheets and to manufacture corrugated and galvanized iron. The addition of tin plate mills is also contemplated after the sheet mills get into operation, as well as a plant for manufacturing tin cans.

The Phœnix Iron Works have incorporated at Portland, Ore., for the purpose of operating the old plant of Wolff & Zwicker, at one time an important establishment in the machinery trade. The capital stock of the new company is $30,000. The officers are as follows: President, Samuel Morrow; vice-president, Henry H. Fuchs; secretary and treasurer, Louis Steinhauser; manager, F. Wolff.

The American Wire Fence Company have been incorporated at Chicago with a capital stock of $100,000, for the manufacture of wire, wire fence and other wire products. The incorporators are Nathan L. Clement, Arthur A. Clement and Robert J. Kerr.

The Cleveland Axle Mfg. Company, Canton, Ohio, announce that they have partially resumed operations at their plant, which was recently damaged by fire, and expect to have it in full operation by the first of next week.

The Reading Iron Company, Reading, Pa., have reduced the price for puddling from $4.25 to $4 per ton.

### General Machinery.

The Pringle & Brodie Machinery Company have been incorporated at Chicago by George W. Pringle, William Brodie and John C. Pirie, with a capital stock of $25,000, to manufacture machinery and hardware.

Among recent orders received by the York Mfg. Company, York, Pa., are the following: Lion Brewery, Adam Schlaelzle, proprietor, New Haven, Conn., 65-ton refrigerating machine and piping for brewery; Avoyelles Ice Company, Mansura, La., 15-ton can ice making plant; Parkersburg Ice Company, Parkersburg, W. Va., 75-ton ice making plant; Harrisburg Water, Light & Power Company, Harrisburg, Ill., 10-ton can ice making plant; Kritz & Galzenleuchter, Galion, Ohio, 25-ton ice making plant; Ropkins & Co., Hartford, Conn., 30-ton refrigerating machine; Valley Ice & Supply Company, Sharpsburg, Pa., 50-ton ice plant; E. M. & A. B. Willis, Washington, D. C., 50-ton can ice making plant; People's Ice Company, Augusta, Ga., 15-ton freezing and distilling system; Radford Ice Company, Radford, Va., 10-ton ice plant; C. F. L'Engle, New York City, 50-ton ice making plant, including boiler system; Fall Brewing Company, Carbondale, Pa., refrigerating plant; Natchez Ice Company, Natches, Miss., 75-ton ice making machine; Independent Ice Company, Wilmington, N. C., 60-ton ice making plant; Hoehl Brewing Company, Bennett, Pa., 30-ton refrigerating machine.

Fenn & Gurney, Wallingford, Conn., machinists, expect to have their new machine shop addition, 24 x 50 feet, completed this week.

The George Burnham Company, Frank Reed, proprietor, Worcester, Mass., manufacturers of sensitive drills with one to ten spindles, planer chucks, upright nut tappers, &c., advise us that they will be in the market shortly for a 12 horse-power gasoline engine, shafting and hangers, and probably an automatic gear cutter and grinder for finishing spindles and other plain work. They have purchased property on the Boston & Albany Railroad, upon which a new shop, 40 x 125 feet, will be erected. Building will be commenced as soon as the weather will permit.

The Exeter Machine Works, Pittston, Pa., are being greatly extended. An extension to the machine shop is being built, 170 x 30 feet; a new boiler shop, 140 x 60 feet; a new office building, 60 x 100 feet, of two stories; new blacksmith shop, and a new power house with a complete new electric plant. The machine shop will be equipped with three electric traveling cranes, automatic turret lathes, floor drilling machines, boring mills, with other special machines adapted to the particular lines manufactured, which consist of hoisting engines and coal handling machinery. The boiler shop will be fitted with an electric traveling crane and a full boiler building equipment. All tools will be driven by machinery. The enlarged works will have three times the present capacity. First running is expected to be July 1, 1902.

The Rusden Machine Company, Warren, R. I., advise us that the report that they are to build a large addition to their plant is incorrect. They are at present building a small addition and propose to make other additions later on. They are not in need of any new equipment.

### Boilers, Engines and Accessories.

The Larzelere Machine Company, Williamsport, Pa., report the best year's business in their history and the outlook for 1902 very promising. They have installed a large number of steam plants with their double valve automatic engines. Among recent shipments are two 125 horse-power engines and boilers to Hambleton Leather Company, Hambleton, W. Va.; 100 horse-power engine and boiler to Ewart & Lake, Mt. Morris, N. Y.; 30 horse-power engine to Kettle Creek Coal Company, Kettle Creek, Pa.; 25 horse-power engine and boiler to A. B. Albertson, Shickshinny, Pa.; 20 horse-power engine and boiler to Hartman & Remley, Benton, Pa.; 50 horse-power engine and boiler to Benton Mills, Benton, Pa.

The E. Keeler Company, Williamsport, Pa., manufacturers of boilers, stacks and tanks, are finishing important extensions of their works, consisting of a hydraulic flanging plant, annealing furnaces and addition to the sheet iron and erection shops, for the purpose of building water tube boilers, at the same time maintaining their regular line of horizontal tubular marine and internally fired boilers. The flanging shop is 130 x 60 feet, sheet iron shop 80 x 40 feet, and the erecting shop 125 x 80 feet, all being of brick. Among new machines installed is a Niles electric crane, 50 feet span; Cleveland punch and shear engine driven rolls, R. D. Wood & Co. universal flanging press, Lennox bevel shears, Bickford radial drill, and Curtis Mfg. Company electric hoists. The works are expected to be in full running by the first of the year with twice their former output.

William Campbell & Co., Cambridgeport, Mass., are rebuilding their boiler shop, which was recently destroyed by fire.

The Babcock & Wilcox Company, through their Pittsburgh offices, have about completed the installation of 5000 horse-power Babcock & Wilcox boilers and stokers in the Shenango works of the National Steel Company, at New Castle, Pa.

The William Tod Company, Youngstown, Ohio, have shipped one 17-inch and 33 x 36 inch horizontal cross compound generator engine, direct connected to a 400-kw. generator, to the Youngstown Iron Sheet & Tube Company; one 32 x 48 inch Porter-Hamilton engine for the Cuyahoga Steel & Wire Company, Cuyahoga Falls, Ohio; a pair of reversing mill engines, with cylinders, 36 x 48 inches, for the Inland Steel Company, at Chicago.

The Oswego Boiler Works, Oswego, N. Y., have incorporated with a capital of $21,000. Daniel McNamara, formerly with the Ames Iron Works, and Ernest Cokefare, connected with the New York office of the boiler works, have acquired an interest in the company. Walter Jermyn has a controlling interest. The plant has been enlarged during the past year to twice its former capacity.

The new buildings which the Marine Iron Works, Dominick street and Southport avenue, Chicago, propose to erect, to take the place of their plant recently destroyed by fire, will consist of the following: a two-story machine shop 40 x 110 feet, a building for a pipe shop and offices to be one and two stories in hight, 50 x 182 feet, and a two-story power house 62 x 64 feet. The company are builders of engines and boats.

### Fires.

The Champion Coated Paper Company's plant, at Hamilton, Ohio, was destroyed by fire December 22. A quantity of valuable machinery is included in the loss, which is estimated at about $750,000. The company have just completed a new brick building which they succeeded in saving.

The plant of the Oriskany Falls Brewing Company, Oriskany Falls, N. Y., was destroyed by fire December 23, entailing a loss of about $50,000. The damage included the power plant.

Kruecke Bros. Mfg. Company's machine shop and foundry, Milwaukee, Wis., suffered a $2500 loss by fire recently.

The flour mill of the Elks Milling Company, Lowellville, Ohio, was destroyed by fire December 22. The loss is estimated at $50,000.

The Janesville Iron Works, Janesville, Pa., suffered a $6000 loss by fire recently. The blacksmith shop was destroyed.

The plant of W. H. Bowman, Knoxville, Tenn., manufacturer of iron fencings, was burned recently. Loss is about $3000.

The factory of the Snap Hook & Eye Company, South Norwalk, Conn., was destroyed by fire last week. The loss is about $40,000.

The box mill of the Jordan Lumber Company, Old Town, Maine, was destroyed by fire December 18.

The carriage factory of Burr & Co., at Broadway and Fifty-fourth street, New York City, suffered a $50,000 loss by fire December 19.

The band saw mill of David Baird, Camden, N. J., was destroyed by fire December 18. The loss is about $40,000, about half covered by insurance.

The factory of the Hyatt School Slate Company at Bangor, Pa., was destroyed by fire December 19, entailing a loss of about $70,000. There is a partial insurance. The proprietors are Myers & Bartlett of Bethlehem.

### Foundries.

Early in the spring the Chandler Pump Company, Cedar Rapids, Ia., will replace their present foundry with a modern building. They also expect to erect a two-story brick warehouse, about 50 x 200 feet.

The Modern Iron Works are a new corporation at Quincy,

Ill., with a capital stock of $40,000, formed for the purpose of operating a foundry. Incorporators are R. V. Clark, Geo. Fischer and A. J. Niemyer.

The Demorest Mfg. Company, Williamsport, Pa., manufacturers of bicycles and sewing machines, are putting in a number of automatic screw machines and have also enlarged their foundry to enable them to meet increasing demands for electrical supply house castings, a branch that has been added within four months. They have recently made a contract to supply the Canadian sewing machine trade through two prominent jobbing houses, one in the province of Ontario and the other in the province of Quebec. E. R. Payne is president of the company and Hugh Macdonald is the manager.

**Hardware.**

The Illinois Pure Aluminum Company, Lemont, Ill., will spend about $50,000 during the coming year in making improvements to their plant. The floor space will be considerably increased and a number of new machines installed. They make aluminum ware, steam jacketed kettles, &c.

The W. J. Clark Company of Salem, Ohio, report a lively demand for their improved hose couplers, known as the Quick as Wink. Their use on compressed air hose in shops where pneumatic tools are used is said to work a great saving of time. The W. B. Pollock Company, Youngstown, Ohio, having tried them in their extensive boiler works, have decided to discard the common coupler and use the Quick as Wink instead. Their order has been placed for 180 sets.

R. K. Ortt, of the Clipper Lawn Mower Company, Norristown, Pa., has invented a machine for the purpose of clearing lakes and ponds of dense grasses. The "water motor," as it is called, weighs about 75 pounds, and is fastened to the side of a rowboat with an upright piece which carries the cutter bar. This extends down the side of the boat 12 inches beneath the surface of the water. The cutter bar is carried at right angle, the knife being driven from the end with a vibrating lever or sway bar, which is pivoted on a yoke. The upper end is ball bearing, working in a cam secured to a shaft pinion attached. The machine, which is operated by hand, will cut the grass about 1 foot under water, the grass rotting as soon as the water gets a chance to run down the inside of the blades, which are nearly porous or hollow.

Timmes & Hecht, manufacturers and galvanizers of railroad, ship, boat and dock spikes, rivets, nails, bolts, &c., Scranton, Pa., commenced running their rolling mill on December 2. The works are made up of five buildings adjoining each other, as follows: Rolling mill proper, 200 x 106 feet; building for the unloading and shearing of scrap, machine shop, &c., 100 x 100 feet; spike factory, 60 x 50 feet; storehouse, 56 x 50 feet, and galvanizing department, 106 x 25 feet. The machinery equipment throughout is the latest and most modern type. The general office is at the works. There is also a branch office and storeroom at 281 North Sixth street, Brooklyn, N. Y., for local business and quick delivery.

**Miscellaneous.**

The Acme Harvester Company, South Bartonville, Ill., have purchased 15 acres of ground, upon which they will build seven large warehouses, the largest being 80 x 650 feet. When these additions are completed they intend to use the entire original plant for manufacturing purposes. The present capacity will be trebled.

F. M. Hicks of the Hicks Locomotive & Car Works, Chicago, Ill., is building for Wallace Brothers' Circus a special car, to be 80 feet long, inside measurement of the body. This is to be used for a private car with six staterooms, kitchen, closet, &c., and to have six-wheel trucks. W. E. Kelly & Co., lumbermen, have also just purchased of F. M. Hicks a four-wheel switcher and logging engine, with 42-inch drivers. This engine is to be delivered immediately.

The Flint Wagon Works, Flint, Mich., are building an addition to the power house. They have recently built a new brick stack.

The Hamilton Metal Pattern Company, Hamilton, Ohio, are erecting a new building, 35 x 75 feet. They hope to be located in their new quarters by the middle of January.

The Indiana Road Machine Company of Fort Wayne, Ind., have purchased the Fleming Mfg. Company, makers of road scrapers, snow plows, &c., for $52,500. They advise us that they expect to install some new tools in a short time.

The Muncie, Hartford & Ft. Wayne Railway Company, Muncie, Ind., have let nearly all contracts for the construction of their road from Muncie to Montpelier. The power house and main car house will be situated at Eaton, with a sub-station near Montpelier.

E. J. Hickson has purchased the National Metallic Bedstead Works, at Marion, Ind. This factory was formerly owned by Charles A. Michaels and was one of the first of its kind established in the State. The statement is made that eight plants are now engaged in the manufacture of iron and brass bedsteads in Indiana, of which three are located at Marion.

Crawshaw & Judd, Worcester, Mass., have commenced business as makers of small forgings to order, and advise us that they are equipped for producing a variety of steam and trip hammer forged work.

The Figprune Cereal Company, San Jose, Cal., are building a new plant. They are not at present in the market for any equipment.

The United Gas, Electric Light & Fuel Company of Fort Edward, N. Y., have increased their capital stock from $150,000 to $200,000.

The Basic Iron Ore Company have incorporated for the purpose of developing mining property. Their headquarters will be at Oxford, N. J.

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**Steel Scales Renewed.**—PITTSBURGH, PA., December 24, 1901.—(*By Telegraph.*)—This week the steel scales of Jones & Laughlins, Limited, of the American Iron & Steel Works, Pittsburgh, and also at the Shenango Works at New Castle and the Sharon Works at Sharon of the National Steel Company have been renewed for next year on this year's basis. Under the terms of these scales the steel workers are receiving the highest wages ever paid them.

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In his speech to the shareholders of the British Westinghouse Company, Mr. Westinghouse stated that it was expected that they would be able to start actual manufacturing at Manchester early in 1902. The works include a machine shop 430 feet wide and 900 feet long. The iron foundry is 170 feet wide by 500 feet long, and the other foundries, the pattern shop and the forge occupy another building, 170 feet wide by 580 feet long. Special attention is to be paid to the comfort of the employees in the matter of heating, ventilation and lavatory accommodation; and house accommodation, with electric and gas heating appliances, will be provided near the works for such of the workmen as care to take them.

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A correspondent to the London *Machinery Market* says that the directors of the J. G. Brill Company of Philadelphia have selected Preston as the site of their proposed branch works in England, after having inspected various towns in the Midlands and north of England. Land has been acquired near the docks, and the corporation will afford the necessary approaches. The works will, it is stated, give employment to about 500 men, and turn out about 1000 cars and 4000 trucks annually.

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An agreement has been made the past week between committees representing the Iron League of America and the Chicago Architectural Iron Workers' Union which provides that the workmen shall receive a minimum wage of 42½ cents an hour, and that none but union men shall be employed by members of the league. The union agrees to permit its members to work on buildings by the side of the nonunion men in case union men cannot be secured. The Iron League is composed of the architectural foundrymen and contractors who erect structural work.

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The Census Bureau has issued a bulletin giving the statistics of manufacturing and mechanical industries for West Virginia, which shows a capital of $55,719,938 invested in 4415 establishments. The value of the products was returned at $74,177,681, to produce which involved an outlay of $1,563,097 for salaries of officials, $12,876,902 for wages, $3,933,514 for miscellaneous expenses and $42,632,813 for materials used.

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The Pressed Steel Car Company of Pittsburgh have received an order from the Baltimore & Ohio Railroad for 3000 steel hopper cars of 100,000 pounds capacity each, and an order from the Sharon Steel Company, Sharon, Pa., for some private cars.

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The statement that the Youngstown Iron Sheet & Tube Company would tear down Alice Furnace at Sharpsville, Pa., which they recently bought, and build a larger furnace is incorrect. The company bought Alice stack to supply their present wants and will begin the erection of a new blast furnace at Hazelton, where their works are located, in the early spring.

# The Iron and Metal Trades.

There have been further conferences in Cleveland on the Ore situation, and it looks as though a satisfactory basis for all grades of Ore will be reached. Subcommittees are now working out the details.

There is increasing alarm over the question of a supply of materials, and notably of Coke. The condition of affairs in the Connellsville region is extraordinary. The fuel is piling up until close to 200,000 tons has accumulated, for lack of cars to move it. On the other hand, the furnaces in the Chicago district, in the Valleys, in Pittsburgh and in the Central West generally are idle, because they are out of fuel. With the enormous pressure on all our works, such delays mean a prolongation of the troubles in arranging for deliveries. And this is at a season, too, when, in many branches of the industry, we ought to begin to pile up stock for the spring trade.

Buying is continuing at a heavy rate. Pittsburgh reports sales of about 150,000 tons of Standard Bessemer Pig Iron for delivery during the first quarter and the first half. It appears that about one-third of this was taken by outside Steel interests, and that an advance has now been squarely established to $15.75, at Valley furnace. It is understood that the U. S. Steel Corporation paid this price, which is an advance of 50 cents per ton since the last purchases.

From other sections of the country come reports of continued steady buying of Foundry, Forge and Basic Iron, and minimum quotations are gradually being confined to a smaller and smaller number of sellers.

In the Steel market there is little of interest. The scarcity continues and is affording opportunities for the marketing in this country of moderate lots of small sized foreign Billets. Recently some foreign Steel has been placed in the Cleveland district. Reports from Europe indicate that a somewhat better feeling is developing. The Germans have sold some good blocks of Wire Billets in England, and a good tonnage of Sheet Bars has also been placed, the English mills taking advantage of the necessities of the German Steel works. Apparently, now, the European makers are beginning to realize that there will be no interference in their markets on our part for a long time to come.

Rather better reports have come lately as to the position of the Plate market. In Structural Material the tonnage continues to come in at a rapid rate. As indicating how enormous is the amount of work on hand, we note the report that the American Bridge Company have on their books for fabrication upward of 400,000 tons of bridge and structural work.

The Copper trade continues at sea, and the wildest reports are given currency, one of them being that Lake Copper has sold down to 12c. per lb. It would seem that some of the warring interests are protesting somewhat too loudly. It is not a question how cheaply the one or the other can make the metal, but at what price consumption will be stimulated sufficiently to absorb current make and gradually take care of the accumulation. The market may overshoot the mark.

## A Comparison of Prices.

At date, one week, one month and one year previous.

**Advances Over the Previous Month in Heavy Type. Declines in Italics.**

| | Dec. 25, 1901. | Dec. 18, 1901. | Nov. 27, 1901. | Dec 26, 1900. |
|---|---|---|---|---|
| **PIG IRON:** | | | | |
| Foundry Pig, No. 2, Standard, Philadelphia | **$15.75** | $15.75 | $15 50 | $15.50 |
| Foundry Pig, No. 2, Southern, Cincinnati | 14.25 | 14.25 | 14.25 | 13.75 |
| Foundry Pig, No. 2, Local, Chicago | **15.50** | 15.50 | 15.00 | 15.00 |
| Bessemer Pig, Pittsburgh | **16.50** | 16.50 | 16.00 | 13 25 |
| Gray Forge, Pittsburgh | **15.25** | 15.00 | 14.75 | 13.25 |
| Lake Superior Charcoal, Chicago | **18.50** | 18.50 | 17.00 | 19 50 |
| **BILLETS, RAILS, ETC.:** | | | | |
| Steel Billets, Pittsburgh (nom) | 27.00 | 27.00 | 27.00 | 19.75 |
| Steel Billets, Philadelphia (nom) | **29.50** | 29.00 | 29.00 | 21.00 |
| Steel Billets, Chicago, (nom) | ..... | ..... | .. . | 20 75 |
| Wire Rods (delivered) | 34.25 | 34.25 | 35.00 | 33 00 |
| Steel Rails, Heavy, Eastern Mill | 28.00 | 28.00 | 28.00 | 26 00 |
| Spikes, Tidewater | 2.00 | 2.00 | 2.00 | 1 50 |
| Splice Bars, Tidewater | 1.65 | 1.65 | 1 65 | 1 35 |
| **OLD MATERIAL, PER GROSS TON:** | | | | |
| O. Steel Rails, Chicago | 14.00 | 14.00 | 14.00 | 11 00 |
| O. Steel Rails, Philadelphia | **18.00** | 18.00 | 17 50 | 16.00 |
| O. Iron Rails, Chicago | 21.00 | 21 50 | 21 00 | 17.50 |
| O. Iron Rails, Philadelphia | 21.50 | 21.50 | 21 50 | 18 00 |
| O. Car Wheels, Chicago | **16.00** | 15.50 | 15.50 | 15.50 |
| O. Car Wheels, Philadelphia (nom) | **16.75** | 16.75 | 16.00 | 17.00 |
| Heavy Steel Scrap, Chicago | 13.50 | 13.50 | 13.50 | 11.00 |
| **FINISHED IRON AND STEEL, PER POUND:** | | | | |
| Refined Iron Bars, Philadelphia | 1.65 | 1.65 | 1 65 | 1 45 |
| Common Iron Bars, Chicago | 1.65 | 1.65 | 1 65 | 1 45 |
| Common Iron Bars, Youngstown | 1.50 | 1.55 | 1 55 | 1 30 |
| Steel Bars, Tidewater | 1.70 | 1.70 | 1 70 | 1.40 |
| Steel Bars, Pittsburgh | 1.50 | 1.50 | 1.50 | 1 25 |
| Tank Plates, Tidewater | 1.75 | 1.75 | 1.75 | 1 55 |
| Tank Plates, Pittsburgh | 1.60 | 1.60 | 1.60 | 1.40 |
| Beams, Tidewater | 1.75 | 1.75 | 1.75 | 1.65 |
| Beams, Pittsburgh | 1.60 | 1.60 | 1.60 | 1.50 |
| Angles, Tidewater | 1.75 | 1.75 | 1.75 | 1.55 |
| Angles, Pittsburgh | 1.60 | 1 60 | 1.60 | 1 40 |
| Skelp, Grooved Iron, Pittsburgh | *1.75* | 1.72½ | 1.80 | 1.55 |
| Skelp, Sheared Iron, Pittsburgh | *1.80* | 1.80 | 1.85 | 1 60 |
| Sheets, No. 27, Pittsburgh | 2.90 | 2.90 | 3.00 | 2.85 |
| Barb Wire, f.o.b. Pittsburgh | 2.90 | 2 90 | 2.90 | 2 80 |
| Wire Nails, f.o.b. Pittsburgh | 1.95 | 1.95 | 2.15 | 2.20 |
| Cut Nails, Pittsburgh | 2.05 | 2.05 | 2.05 | 1.95 |
| **METALS:** | | | | |
| Copper, New York (nom) | *12.00* | 13.87½ | 16.75 | 17.00 |
| Spelter, St. Louis | 4.15 | 4.12½ | 4.15 | 4.00 |
| Lead, New York | *4.00* | 4.00 | 4.37½ | 4.37½ |
| Lead, St. Louis | *3.95* | 3.95 | 4.25 | 4.20 |
| Tin, New York | *25.30* | 24.50 | 33 00 | 28.00 |
| Antimony, Hallett, New York | 8.25 | 8.25 | 8.37½ | 9.25 |
| Nickel, New York | 60.00 | 60.00 | 60.00 | 55.00 |
| Tin Plate, Domestic Bessemer, 100 lbs., New York | 4.19 | 4.19 | 4.19 | 4.19 |

## Chicago.

FISHER BUILDING, December 24, 1901.—(*By Telegraph.*)

Exceptionally heavy business is reported in practically all branches of trade. Buyers who had been waiting in the expectation of lower prices have become convinced that it is not prudent to wait any longer, and a fresh demand has thus been injected into the market to give it additional activity and strength. Transactions have been heavy in Bars, Structural Material, Plates and general railroad supplies. The Coke situation has grown worse instead of improving, and two more blast furnaces in this district, both producing Foundry Iron, have been banked. Deliveries from mills at Eastern points are still seriously delayed because of lack of either cars or motive power.

**Pig Iron.**—The sales of the week have principally consisted of Southern Foundry Iron. These include one 3000-ton contract, several 1000-ton lots and quite a number of orders of 500 tons. More of the Southern furnace companies are advancing their prices. It is expected that the market will shortly show a general advance of at least 50c. Stocks at Southern furnaces are getting down to a very low point. Trouble is constantly experienced in securing deliveries from the South because of the shortage of cars. The local situation is particularly strong. The scarcity of Coke has

caused two more furnaces producing Foundry Iron to be banked and danger is imminent that more will have to suspend operations if the supply does not improve. Inquiries are numerous, indicating a continuance of the buying movement. We quote as follows:

| | |
|---|---|
| Lake Superior Charcoal | $18.50 to $19.25 |
| Local Coke Foundry, No. 1 | 16.00 to 16.50 |
| Local Coke Foundry, No. 2 | 15.50 to 16.00 |
| Local Coke Foundry, No. 3 | 15.00 to 15.50 |
| Local Scotch, No. 1 | 16.00 to 16.50 |
| Ohio Strong Softeners, No. 1 | 17.60 to 17.85 |
| Southern Silvery, according to Silicon | 16.15 to 16.40 |
| Southern Coke, No. 1 | 15.65 to 16.15 |
| Southern Coke, No. 2 | 15.15 to 15.65 |
| Southern Coke, No. 3 | 14.65 to 15.15 |
| Southern Coke, No. 1 Soft | 15.65 to 16.15 |
| Southern Coke, No. 2 Soft | 15.15 to 15.65 |
| Foundry Forge | 14.15 to 14.65 |
| Southern Gray Forge | 14.15 to 14.65 |
| Southern Mottled | 14.15 to 14.65 |
| Southern Charcoal Softeners, according to Silicon | 15.50 to 16.50 |
| Tennessee Silicon Pig | 16.40 to 16.65 |
| Alabama and Georgia Car Wheel | 19.50 to 20.50 |
| Malleable Bessemer | 17.00 to 17.50 |
| Standard Bessemer | .... to 17.50 |
| Jackson County and Kentucky Silvery, 8 per cent. Silicon | 17.60 to 17.85 |

**Bars.**—Activity and buoyancy are the features of current trade. The activity is particularly noticeable in Steel Bars, but large sales have also been made of Bar Iron. Consumers who had been holding back in the hope of a lower market have changed their views and are now freely placing orders for their requirements for the next quarter. Some manufacturers have passed a good tonnage, partly because of inability to make the deliveries desired, but partly because they are of the opinion that the near future will see higher prices. Hoops are in good demand, the mills are sold well ahead on the desirable sizes. Mill shipments are quoted at 1.65c. to 1.80c., Chicago, for either Bar Iron or Soft Steel, and 2.05c. to 2.20c., base, for Hoops. Jobbers are enjoying a continued large demand from store and quote Bars 1.90c. to 2c., and Steel Hoops at 2.50c., base.

**Structural Material.**—The tonnage placed the past week was so large as to make it one of the best weeks in the year. The demand is surprising when the time of year is considered. The mills are crowded with work for the winter months, insuring the maintenance of prices during what is regarded as the dull period. Mill shipments are quoted as follows: Beams, Channels and Zees, 15 inches and under, 1.75c. to 1.90c.; 18 inches and over, 1.85c. to 2c.; Angles, 1.75c. to 1.90c. rates; Tees, 1.80c. to 1.90c.; Universal Plates, 1.75c. to 1.85c.; small lots of Beams and Channels from local yards are quoted at 2.25c.; Angles, 2c. rates; Tees, 2.15c.

**Plates.**—The new contracts booked since last week's report foot up thousands of tons. Specifications are being made against old contracts so long on the mill books that they are almost regarded dead. The situation has completely changed in the Plate trade from quietness and apprehension to activity and strength. Mill shipments are quoted as follows: Tank Plate, ¼-inch and heavier, 1.75 to 1.80c., Chicago; Flange, 1.85c. to 1.95c.; Marine, 1.95c. to 2.05c. Jobbers are selling small lots from store at 1.90c. to 2c. for Tank, and 2.25c. for Flange, with the usual extras for heads, segments, lighter gauges, &c.

**Sheets.**—New business is being offered to the mills, although they are still much in arrears and making deliveries on old contracts. Prices are well sustained. Mill shipments of No. 27 Black Sheets are held at 3.15c. to 3.40c., Chicago, and small lots from stock at 3.50c. to 3.70c. Small lots of Galvanized are maintained at 70 to 70 and 2½.

**Merchant Pipe.**—The usual quiet trade due at this season is reported. Good inquiries are being received and the prospects are excellent for heavy business after the new year. Carload lots are now quoted as follows, random lengths: Black, ⅛ to ½ inch, 60 off; ¾ to 10 inches, 67 off; Galvanized, ⅛ to ½ inch, 47 off; ¾ to 6 inches, 55 off.

**Boiler Tubes.**—Jobbers are having a moderate demand. Quotations are as follows:

| | Steel. | Iron. |
|---|---|---|
| 2¾ to 5 inches | 57½ | 47½ |
| 1¾ to 2½ inches | 50 | 40 |
| 1 to 1½ inches | 35 | 30 |
| 6 inches and larger | 52½ | 45 |

**Merchant Steel.**—All kinds of smooth finished Steel are in strong demand, with the leading mills sold up for three to four months. A heavy trade is also enjoyed in Toe Calk and Sleigh Shoe Steel. Mill shipments, Chicago, are quoted as follows: Smooth Finished Machinery Steel, 2c. to 2.10c.; Smooth Finished Tire, 1.85c. to 2c.; Open Hearth Spring Steel, 2.30c. to 2.40c.; Toe Calk, 2.40c. to 2.60c.; Sleigh Shoe, 1.85c. to 1.90c.; Cutter Shoe, 2.40c. to 2.60c.; Cold Rolled Shafting, 55 off in carload lots. Ordinary grades of Crucible Tool Steel are quoted at 6¾c. for carloads and 7c to 7½c. from store; Specials, 12c. upward.

**Rails and Track Supplies.**—Numerous inquiries for Rails of Standard Sections are being received, but much difficulty is found in endeavoring to arrange satisfactory deliveries. Quite a good tonnage has been booked, practically all of which has gone to Eastern mills. These mills are now only able to promise late fall delivery. An unprecedented trade is reported in Fastenings. Standard Section Rails are quoted at $28, and Light Rails at $30.50 to $35. Track Fastenings are as follows: Splice Bars, 1.70c. to 1.80c.; Spikes, 2c. to 2.10c.; Track Bolts, with Hexagon Nuts, 2.90c. to 2.95c.; Square Nuts, 2.75c. to 2.80c.

**Old Material.**—The cut in freight rates on some of the Western roads has enabled a great deal of Scrap to be shipped from outside points to consuming centers, and consequently many dealers through the West have cleaned up their stocks. Consumers are quite generally out of the market. Prices show a tendency to weakness, except on Cast Scrap and Car Wheels, which are strong, in sympathy with Pig Iron. The following are approximate quotations per gross ton:

| | |
|---|---|
| Old Iron Rails | $21.00 to $21.50 |
| Old Steel Rails, mixed lengths | 14.00 to 14.50 |
| Old Steel Rails, long lengths | 19.00 to 20.00 |
| Heavy Relaying Rails | 25.50 to 26.00 |
| Old Car Wheels | 16.00 to 16.50 |
| Heavy Melting Steel Scrap | 13.50 to 14.00 |
| Mixed Steel | 10.50 to 11.00 |

The following quotations are per net ton:

| | |
|---|---|
| Iron Fish Plates | $16.00 to $17.00 |
| Iron Car Axles | 20.00 to 21.00 |
| Steel Car Axles | 18.00 to 18.50 |
| No. 1 Railroad Wrought | 15.00 to 15.50 |
| No. 2 Railroad Wrought | 13.25 to 13.75 |
| Shafting | 16.00 to 16.50 |
| No. 1 Dealers' Forge | 12.15 to 13.00 |
| No. 1 Busheling and Wrought Pipe | .... to 11.50 |
| Iron Axle Turnings | 11.25 to 11.75 |
| Soft Steel Axle Turnings | 10.50 to 11.00 |
| Machine Shop Turnings | 9.50 to 10.00 |
| Cast Borings | 5.00 to 5.25 |
| Mixed Borings, &c | 5.25 to 5.50 |
| No. 1 Boilers, cut | 11.00 to 11.50 |
| No. 2 Boilers, cut | 10.00 to 10.50 |
| Heavy Cast Scrap | 11.50 to 12.00 |
| Stove Plate and Light Cast Scrap | 9.00 to 9.25 |
| Railroad Malleable | 12.50 to 13.00 |
| Agricultural Malleable | 11.50 to 12.00 |

**Metals.**—Copper has fallen still lower and carload lots of Lake are now quoted at 13½c., and Casting Brands, 13¼c. Pig Lead is firm at the reduction made last week, being held at 3.95c. for Desilverized and 4.05c. for Corroding in 50-ton lots. Dealers quote selling prices on Old Metals as follows: Pipe Lead, 3.90c.; Zinc, 2.75c. The situation is so unsettled on Copper that the trade in Old Copper and Brass is practically at a standstill. The dealers refuse to part with their stock of Old Copper and Brass at such prices as consumers are now offering. These offers are much under our last quotations and are made low enough to cover an additional decline.

**Coke.**—The supply of Coke grows smaller instead of larger. The leading Connellsville Coke manufacturers are notifying their customers that the present cause of slow delivery is the shortage of motive power and that it is impossible to state with certainty how soon this difficulty will be overcome. Meanwhile foundrymen are making frantic efforts to secure enough fuel to serve their purposes and are offering $6.50 to $7. The consumption of Anthracite Coal in foundry cupolas is increasing.

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The death of Major Henry S. Pickands will in no way change the style or affect the firm of Pickands, Brown & Co. of Chicago, but the business of the firm will continue to be conducted on the same lines and in the same manner precisely as heretofore.

The Republic Iron & Steel Company, Chicago, are favoring their customers with copies of a daily memo-

randum calendar for 1902. This calendar is designed for desk use and provides ample room on each daily sheet for business engagements and other memoranda. Each sheet bears an allusion to some one of the numerous products of the company.

## Philadelphia.

FORREST BUILDING, December 23, 1901.

The market during the week has been somewhat interrupted by the approaching holidays and also by the difficulty in getting deliveries on what has been sold. The feeling is extremely sensitive and it would be an easy matter to start "a boom" if "the powers that be" would countenance it. There appears to be a determination, however, to discourage any movement of that kind, so that, as a rule, there is no difficulty in placing orders at unchanged prices, providing that deliveries are arranged so as to cover three to six months of the coming year. For quick shipments prices have to be arranged according to circumstances, but more or less of a premium has to be paid for guaranteed prompt deliveries. It is not improbable that there may be a slight revision in prices after the first of the year, but in the meanwhile the matter has not developed sufficiently to warrant immediate action.

**Pig Iron.**—There is no relief from the scarcity which has been felt for a month past, and in fact in some lines it is greater than ever. Basic Iron is badly wanted, but there is practically none for sale, although a small tonnage was secured at $15. Bessemer is also extremely scarce, but in the absence of offerings it is thought that $17 at furnace would be paid if it could be had. Foundry Irons can be picked up here and there, but the supply for quick delivery is too restricted to meet all requirements. For the first three or six months of the coming year prices are nominally unchanged. Makers deprecate any premature advance, but they are not pushing business, although from regular customers they accept moderate lines of business at about the same prices as have been quoted for two or three weeks past, but the disposition is very conservative, and both sides wait the trend of events before making very heavy commitments. The general impression is that present quotations will continue until well into January, but there is no doubt that a very optimistic feeling prevails. Prices are more or less nominal, but the extreme figures both ways would be about as follows for Philadelphia and nearby points: No. 1 X Foundry, $16.25 to $16.50; No. 2 X Foundry, $15.75 to $16.25; No. 2 Plain, $15.35 to $15.65; Standard Gray Forge, $14.50 to $14.75; Ordinary Gray Forge, $13.75 to $14; Basic (Chilled), about $15, and Bessemer, $17 to $17.50.

**Billets.**—To-day's prices are firm, $29.50 to $30, and buyers find great difficulty in securing prompt deliveries even at these high figures. For the first six months of the coming year something better could be done, but makers are less disposed to discount the future than they have been for some time past.

**Muck Bars.**—Demand slow and prices easier at about $27 to $27.25, f.o.b. makers' mills.

**Finished Material.**—The year is closing most satisfactorily in most of the rolling mill products, the conditions in all respects being very satisfactory. Plates and Bars are probably in somewhat less urgent demand, but there is plenty of work in sight, and in the meanwhile plenty to go on with. Prices are steady and unchanged as follows: Plates—Universals, 1.75c. to 1.80c.; Sheared, 1.75c. to 1.80c.; Flange, 1.85c. to 1.95c.; Fire Box, 1.95c. to 2.05c.; Marine, 1.95c. to 2.05c.; C. H. No. 1, Iron, 2.40c.; C. H. No. 2, Flange, 2.90c.; C. H. Flange Fire Box, 3.40c. Bars—Iron, 1.67c. to 1.72c.; Steel, 1.70c. to 1.75c.; Angles, 1.75c. to 1.85c.; Beams and Channels, 1.75c. to 1.85c.

**Old Material.**—The market has slacked up a little, as consumers wanted to have as little stock in their yards as possible pending the usual squaring up at the close of the year. Prices are firmer, however, and bids and offers are about as follows for deliveries in buyers' yards: Low Phosphorus Scrap, $22 to $22.50; Choice Railroad Scrap, $20 to $21; Country Scrap, $16 to $17; No. 2 Light (Ordinary), $12.50 to $12.75; No. 2 Light (Forge), $14 to $14.75; Machinery Cast, $14 to $14.50; Heavy Steel, $18 to $18.50; Old Steel Rails, short lengths, $18 to $18.50; Old Iron Rails, $21.50 to $22; Wrought Turnings, $12.75 to $13.25; Cast Borings, $8 to $8.25; Old Car Wheels, $16.75 to $17.25; Iron Axles, $24 to $25; Steel Axles, $20 to $21.

## Cleveland.

CLEVELAND, OHIO, December 23, 1901.

**Iron Ore.**—The total receipts of Ore at the Lake Erie ports during the year were 17,014,076 tons, as against 15,797,787 gross tons during the season of 1900. The shipment of Ore from the lakes to the furnaces this season, between May 1 and December 1, amounted to 14,204,596 gross tons, as against 11,613,773 for the same period of 1900. At the same time that these computations are made it is learned that the movement of the Michipicoton Ores, which are mined along the north shore of Lake Superior, amounted to 230,000 tons during the season of 1901, of which amount 160,000 came to ports along the south shore of Lake Erie, the remainder going to the points of Pig Iron production in Canada. The shippers of Ore and the owners of vessel property have already started to talking season carrying rates for next year. Mr. Gayley of the steel corporation was in the city on Saturday and held a preliminary conference with some of the outside shippers. He was preceded by A. B. Wolvin, the general manager of the steel corporation fleet, who talked with the vessel owners. It is possible that a general conference among the Ore men will be held early in January to definitely decide the prices of Ore for next year, the supposition now being that Mr. Gayley's recent suggestion of a continuation of this year's prices will be adopted. The rates of carriage will be fixed as soon as the Ore prices are known. The vessel interests have taken a united stand for $1 between Duluth and Ohio, and some of the shippers who are able to compute losses on the season's rates are demanding a reduction even from 80c., the rate paid for the season just closed. Those who are well informed look for a continuation of 1901 rates into 1902, since there will in all probability be a great similarity in the selling prices of Ore.

**Pig Iron.**—The producers of Bessemer Pig Iron upset the theories about stable prices for their product this year, in the interest of a continued heavy output, by advancing the price 50c. on the ton in the Valleys. Within the last three or four days some sales of Bessemer in large quantities have been made by members of the Bessemer Association, at $15.75 in the Valley, for February and March delivery. The available material for January has about all been sold up at the old price of $15.25. What material there is left for January delivery will probably be sold upon the old basis. Some of the larger buyers have covered their needs at the price named, and it is reported that some good sized sales have been made. Some small sales of Basic have also been made during the week at the prices established a week ago of $15.25 in the Valleys, and the probable output for the quarter is being pretty well taken up. The demand for Foundry grades continues to be excessively heavy and the market is correspondingly strong. This week the producers have refused to offer material for delivery short of the latter part of February. The prices are holding steady at $16 and $15.50 in the Valley for Nos. 1 and 2 respectively. Southern Foundry No. 2 is still being quoted at $11.50 to $11.75, Birmingham, to which the freight of $4.70 is added to make up the Cleveland rate.

**Finished Material.**—The market story this week is one of continued activity along all lines, with good showings in all grades. If anything Structural Material seems to be the leader, as is evidenced by the fact that some contracts are now being taken which entail deliveries during the next six or seven months. The showing is the more surprising in the light of the fact that this is usually the dullest period of the year for Structural Steel. Many of the big contractors are now making contracts to cover possible future needs, having nothing upon which to base ordering. The possibilities, of

course, are that much of the material now ordered will not be shipped to the present buyers. There has been some talk of better prices, but this does not last long and seems to be without foundation. Billets are off of the market, but any having material might find a ready market at between $28 and $29. The ordering of Steel Plates keeps up, as the ship orders and the car orders seem to have no limit just now. The market is stronger than it has been for months. The price therefore is holding unquestionably at 1.70c. The demand for Bars is fairly good. The sales in fact have been in excess of the production, although not enough so to warrant any alarm about deliveries. The prices hold at 1.50c., Pittsburgh, on Bar Iron; 1.50c., Pittsburgh, for Bessemer Bar Steel, and 1.60c., Pittsburgh, for Open Hearth Bar Steel. Sheets are sold, mostly, here out of store. On mill sales of carload lots, however, the quotation on No. 27 is from 3.10c. to 3.20c., with customary differences for less than carload lots.

**Old Material.**—The market this week has been steady and strong, no change being made in quotations. The ruling prices are: No. 1 Wrought, $16.50 net; Cast Borings, $8 gross; Wrought Turnings, $12.25 gross; Cast Scrap, $13 net; Stove Plate, $10 net; Heavy Steel, $17 gross; Steel Rails, $17 gross; Old Iron Rails, $22 gross; Old Iron Axles $19 gross; Old Car Wheels, $17 gross.

## Pittsburgh.

HAMILTON BUILDING, December 24, 1901.—(*By Telegraph.*)

**Pig Iron.**—At the present time eight or ten furnaces in the Mahoning and Shenango Valleys are banked for want of Coke, and it is likely that some stacks will have to blow out. The car situation is getting worse, and in one day recently less than 20 cars were furnished the entire Connellsville region, not counting individual cars. Coke concerns, whose daily requirements are 100 cars or over, in some days have not been given a single car and other days less than 20. This condition has caused almost a famine in Coke, and blast furnaces have offered as high as $3.50 a ton for it, if the seller will guarantee shipment. Pig Iron is very scarce, and some large sales of Bessemer amounting to 25,000 to 30,000 tons and for delivery first half, have been sold at $16, at furnace. Furnaces are piling Iron in some cases for want of cars and the situation is critical. Reports are that a large block of Iron has been sold to the Steel Corporation and that the output of the furnaces in the association for the first quarter is under contract to the corporation. Forge Iron is firm at $5.50, Pittsburgh, and Foundry Iron is also very scarce. We quote Bessemer Iron at $16 at furnace and note sales of about 25,000 tons for first half at that price. We also note sales of 2000 tons of Gray Forge at $15.50, Pittsburgh. No. 2 Foundry is $16 to $16.25; No. 1, $16.50 to $16.75, f.o.b. cars, Pittsburgh.

**Billets.**—The Steel market is firm, but demand is mostly for small lots, which being $27 to $27.50, Pittsburgh, consumers who would make contracts running through, say, first half of next year could buy their Steel at very much lower prices.

(*By Mail.*)

The Iron trade may be said to be in a critical condition from the fact that the car situation is worse than at any time in the last 60 days, and it is almost certain that quite a number of blast furnaces in both Valleys, and also in the Pittsburgh district, will have to close down, being utterly unable to get Coke. Furnaces that use 20 cars of Coke a day have not got that amount in almost a week, and at this writing quite a number of stacks are banked and will have to close down unless there is immediate improvement in supply of cars. The fault is not with the Coke operators, but entirely with the railroads. Should there be a heavy decrease in the output of Pig Iron the large consumption now going on might have the effect of sending prices skyward in a very short time. As it is, several lots of Bessemer Iron for delivery in first quarter have sold at $16 at furnace, and the outlook is that prices may be higher before this week is out. Steel is firm, but demand is altogether for small lots. In Finished Material there is nothing of particular interest to note. There is a moderate volume of tonnage, considering the season of the year, and prices are firm, with the exception of Sheets and Tubes, which are not quite as strong as they were some time ago. The outlook for 1902 is excellent, and with the heavy tonnage of Rails, Pig Iron, Structural Shapes and other material already on the books of the mills, present conditions for first half of the year at least are assured.

**Rails.**—If the prospective business for Mexico is placed it is said it will amount to about 150,000 tons. We quote Standard Sections at $28 at mill. The shutdown of the Rail mills this year will be confined to one day at Christmas and the same at New Year's, on account of the mills being so congested with tonnage.

**Ferromanganese.**—The local producer continues to quote domestic Ferro at $52.50, delivered buyer's mill. Foreign is offered at a somewhat lower price.

**Muck Bar.**—There is not much demand, and we quote standard grades of Muck Bars at $29, delivered at buyer's works.

**Rods.**—There is some inquiry in the market and it is probable some business in Rods will be put through after the first of the year. We quote ordinary Bessemer Rods at $32.25 to $32.50 at maker's mill.

**Plates.**—We are advised that tonnage in Plates is improving considerably and some good sized orders have been placed by the Steel car builders and also by the locomotive shops. Builders of lake boats are also placing some contracts and the outlook is that after the first of the year the Plate mills will have all the work they can do. Prices are being rigidly held and we quote: Tank Plate, ¼-inch thick and thicker, up to 100 inches in width, 1.60c. at mill, Pittsburgh; Flange and Boiler Steel, 1.70c.; Marine, Ordinary Fire Box, American Boiler Manufacturers' Association specifications, 1.80c.; Still Bottom Steel, 1.90c.; Locomotive Fire Box, not less than 2.10c., and it ranges in price to 3c. Plate more than 100 inches wide, 5c. extra per 100 lbs. Plate 3-16 inch in thickness, $2 extra; gauges Nos. 7 and 8, $3 extra; No. 9, $5 extra. These quotations are based on carload lots, with 5c. extra for less than carload lots; terms, net cash in 30 days.

**Sheets.**—The market is only fairly firm, some of the new Sheet mills being anxious for tonnage and willing to make slight concessions in prices for desirable orders. However, there is quite a large demand and most of the mills are still pretty comfortably filled. We quote Black Sheets, Box Annealed, one pass through cold rolls, as follows: Nos. 10, 11 and 12, 2.40c.; Nos. 14 and 15, 2.50c.; Nos. 16 and 17, 2.60c; Nos. 18 to 21, inclusive, 2.70c.; Nos. 22, 23 and 24, 2.80c.; Nos. 25 and 26, 2.90c.; No. 27, 3c.; No. 28, 3.10c.; No. 29, 3.25c.; No. 30, 3.35c. For good orders Sheets can be bought on the basis of 2.80c. for No. 26, 2.90c. for No. 27 and 3c. for No. 28. Small lots of Sheets bring about 3.10c. for No. 27 and 3.15c. for No. 28. We quote Galvanized Sheets at 70 and 5 off in carloads and 70 off in small lots, maker's mill.

**Structural Material.**—Tonnage continues heavy and the mills are filled up for the first two months of the year or longer. Some large jobs are being placed, among which was one for about 7000 tons, taken by a local mill. A good deal of tonnage in Shapes is being sent into Canada. We quote: Beams and Channels, up to 15-inch, 1.60c.; over 15-inch, 1.70c.; Angles, 3 x 2 up to 6 x 6 inches, 1.60c.; smaller sizes, 1.55c. to 1.60c.; Zees, 1.60c.; Tees, 1.65c.; Steel Bars, 1.50c., half extras, at mill; Universal and Sheared Plates, 1.60c. All above prices are f.o.b. Pittsburgh. Small lots of Beams and Channels for prompt shipment bring from 10c. to 25c. per 100 pounds higher prices than the above.

**Merchant Steel.**—New tonnage is somewhat light, but will probably improve after the first of the year. Many buyers are placing orders for small lots only. There is no change in prices and we quote: Tire Steel, best quality, 1.70c.; Toe Calk, 1.80c. to 1.85c.; Hammered Lay Steel, 3.50c.; Open Hearth Spring, 2.50c. to 2.75c.; Steel Bars, 1.50c., base, in carloads, and 1.60c. in

small lots; ordinary Plow Slabs up to 6 inches wide, 2.25c.; over 6 inches wide, 2.40c. For ordinary orders we quote Cold Rolled and Cold Drawn Shafting at 60 per cent. off in carloads and 55 per cent. off in less than carloads, delivered at all points east of the Mississippi River. We quote Tool Steel at 6c. and upward, depending on quality.

**Bars.**—Tonnage in the last week or two, in both Iron and Steel Bars, has improved somewhat. Car builders are placing large contracts for delivery over first half of the year and the outlook for the future is excellent. Established prices on both Iron and Steel Bars are being firmly held; any concessions being made are by outside mills. We quote Iron and Steel Bars at 1.50c. at mill, in carloads and larger lots, and 1.60c. in small lots.

**Boiler Tubes.**—Demand continues active and the market is firm. Prices to consumers in carloads are as follows:

| *Boiler Tubes.* | Up to 22 feet. Per cent. |
|---|---|
| Steel. | |
| 1 inch to 1¾ inch and 2¾ inch to 5 inch, inclusive | 65½ |
| 2 inch to 2½ inch, inclusive | 60 |
| 6 inch and larger | 59 |
| Iron. | |
| 1 inch to 1½ inch and 2½ inch | 43½ |
| 1¾ to 2¼ inch | 43 |
| 2¾ to 13 inch | 53 |

**Skelp.**—Some contracts for Steel Skelp for delivery running through first quarter have recently been placed. The general market, however, is quiet. We quote Grooved Iron Skelp at 1.75c .and Sheared at 1.80c. Steel Skelp is held at about 1.75c. for Grooved and 1.80c. for Sheared, for the lighter gauges. Some of the mills rolling Iron Skelp cannot buy raw material and meet the present market, and may possibly close before long, unless the Skelp situation improves.

**Merchant Pipe.**—There is only a fair volume of tonnage, and new business will probably be light for some time to come. Some of the outside Pipe mills are shading prices. To consumers in carloads prices are as follows:

| *Merchant Pipe.* | Per cent. Black. | Per cent. Galvd. |
|---|---|---|
| ⅛ to ½ inch and 11 to 12 inch | 61 | 48 |
| ⅝ to 10 inch | 68½ | 56 |
| *Casing, Random Lengths.* | | |
| | S. & S. | I. J. |
| 2 to 3 inch | 58 | 53½ |
| 3½ to 4 inch | 63 | 59 |
| 4½ to 12½ inch | 65 | 61½ |
| *Casing, Cut Lengths.* | | |
| | S. & S. | I. J. |
| 2 to 3 inch | 53½ | 59 |
| 3½ to 4 inch | 59 | 55 |
| 4½ to 12½ inch | 61½ | 57½ |

**Connellsville Coke.**—Output of Coke in the Connellsville region last week was a record breaker, and amounted to 240,000 tons. The car situation, however, is simply frightful, and the outlook is that a number of ovens will be shut down until it improves. It is said that there are over 200,000 tons of Coke piled up in the region awaiting cars for shipment. We quote strictly Connellsville Furnace Coke at $2.10 to $2.25 at oven, and Foundry at $2.50 to consumers. Main Line Furnace Coke is held at $1.75 to $1.90, and Foundry at $2.10 to $2.25, all in net tons at oven.

**Iron and Steel Scrap.**—Only a moderate tonnage of Old Material is being sold, but demand will likely improve after the first of the year. We quote: No. 1 Wrought Scrap, $17 net ton; Heavy Melting Stock, $17.50 to $18; Busheling Scrap, $13; Cast Iron Borings, $8; Old Iron Rails, $21.50 to $22, all in gross tons.

*(By Long Distance Telephone.)*

The United States Steel Corporation have bought 100,000 tons of standard Bessemer Pig Iron for February and March delivery at $15.75 Valley furnace, an advance of 50c. per ton over previous purchases placed by the corporation for Iron. Of this 75,000 tons was bought from the Bessemer Furnace Association and the balance from outside sources. There is a continuation of conditions by which the Furnace Association was forced to advance the price of Bessemer Iron, and it is almost certain to go higher. Outside Steel interests have bought large blocks of Bessemer Iron, bidding prices up to get deliveries. Connellsville Coke for next year has advanced to $2.25 per ton at oven minimum on contracts for the whole of the year and fully 50 per cent. of the blast furnace capacity in the Valley districts and outside is idle for want of Coke. The United States Steel Corporation did not buy any Basic Iron, their entire purchases being standard Bessemer Iron. In the last two or three days 150,000 tons of Bessemer Iron have been sold for the first quarter and for the first half of the year.

**Connellsville Coke.**—We may state that the price of Connellsville Furnace Coke on contracts running through next year has been fixed at $2.25 per ton at oven, an advance of about 25c. over this year.

## Cincinnati.

FIFTH AND MAIN STS., December 24, 1901 *(By Telegraph.)*

There has been some very good selling all along the line in the Pig Iron market. When the season is considered the buying may be called heavy. Certainly the holiday feature seems to have been eliminated from the proposition altogether. A number of contracts are reported for deliveries extending to December, 1902. In spite of the fact that a number of furnaces declare themselves out of the market at the present prices, the quotation sheet remains unchanged. This is owing to the attitude of the large Southern interests in refusing to advance their figures. This question of price is a most interesting one just at this time. There is a goodly representation of interests which are now clamoring for an advance, and are claiming that even on $1 higher basis the price list would be a conservative one. The question is causing more than a little discussion. It is apparently safe to say that the market is well under the control of a well balanced conservatism. A fair trade is looked for throughout the next week. Freight from Birmingham is $2.75 to this point; from Hanging Rock district $1.10. We quote, f.o.b. Cincinnati:

| | | | |
|---|---|---|---|
| Southern Coke, No. 1 | .... | to | $15.00 |
| Southern Coke, No. 2 | .... | to | 14.25 |
| Southern Coke, No. 3 | .... | to | 13.75 |
| Southern Coke, No. 4 | .... | to | 13.25 |
| Southern Coke, No. 1 Soft | .... | to | 15.00 |
| Southern Coke, No. 2 Soft | .... | to | 14.25 |
| Southern Coke, Gray Forge | .... | to | 13.25 |
| Southern Coke, Mottled | .... | to | 13.25 |
| Ohio Silvery, No. 1 | $15.60 | to | 16.10 |
| Ohio Silvery, No. 2 | 15.10 | to | 15.60 |
| Lake Superior Coke, No. 1 | .... | to | 16.60 |
| Lake Superior Coke, No. 2 | .... | to | 16.10 |
| Lake Superior Coke, No. 3 | .... | to | 15.60 |
| Southern Basic | .... | to | 14.75 |
| *Car Wheel and Malleable Irons.* | | | |
| Standard Southern Car Wheel, chilling grades | $18.25 | to | $18.75 |
| Standard Southern Car Wheel, No. 2 | 17.25 | to | 17.75 |
| Lake Superior Car Wheel and Malleable | 18.50 | to | 19.00 |

**Plates and Bars.**—The market is very strong and active; there are plenty of buyers out for a large tonnage. Steel Bars are especially strong and scarce. Iron Bars have been placed on the same basis as Steel Bars, and are quoted f.o.b. Cincinnati as follows: Iron Bars in carload lots, 1.60c. to 1.65c., with half extras; same in small lots, 1.65c. to 1.80c., with full extras. Steel Bars are same price as Iron Bars. Base Angles, in carload lots, 1.90c.; Plates, ¼-inch and heavier, 1.90c. to 2c.; 3-16 inch, 2.10c.; Sheets, No. 16, 2.90c. to 3c.

## New York.

NEW YORK, December 24, 1901.

**Pig Iron.**—With possibly one or two exceptions all the larger consumers in this district are now pretty well covered for the first three to six months of next year. Among the transactions closed this week was a round lot for a Connecticut foundry. The market is steady. Some sales of Basic Pig, for delivery to Western points, have been made. We quote: No. 1, $16.35 to $17.50; No. 2 X, $15.75 to $16; No. 2 Plain, $15.25 to $16; Gray Forge, $14.65; Tennessee and Alabama brands, No. 1 Foundry, $16; No. 2 Foundry, $15.25; No. 1 Soft, $16; No. 2 Soft, $15.25; No. 3 Foundry, $14.75; No. 4 Foundry, $14.25; Gray Forge, $14.25.

**Steel Rails.**—Apparently the Rail makers of the whole world have in hand the inquiry for the Mexican National road. Several lots may be placed at an early date. We continue to quote $28 at Eastern mill for Standard Sections.

**Finished Iron and Steel.**—The American Bridge Company, who took the first section, involving about 6000 tons of Material, for the Atlantic avenue extension in Brooklyn, have now closed for the balance of the work, the total amounting to about 17,000 tons. The company have also taken the second Wabash bridge over the Ohio at Mingo, calling for about 6000 tons. We hear very little of importations of foreign Structural Material, although some small lots of Angles have been brought in. Prices are quoted as follows at tidewater: Beams, Channels and Zees, 1.75c. to 1.80c.; Angles, 1.75c. to 1.80c.; Tees, 1.80c. to 1.85c.; Bulb Angles and Deck Beams, 2c.; Sheared Steel Plates, are 1.80c. to 1.85c. for Tank, 1.90c. to 1.95c. for Flange, 2c. to 2.05c. for Fire Box. Charcoal Iron Plates are held at 2.40c. for C. H. No. 1, 2.90c. for Flange, and 3.40c. for Fire Box. Refined Bars are 1.65c.; Soft Steel Bars, 1.70c.

## Metal Market.

NEW YORK, December 24, 1901.

**Pig Tin.**—Ever since last Friday the market has been in stages of demoralization. The failure of William Seargant & Co. of London last Friday upset the market in London and it had its sympathetic effect in New York. In London the price of spot broke to £100 and futures declined to £98. The price of spot in this market broke to 22¾c. and late futures touched 22c. Since then, however, the market has recovered slightly, closing prices to-day being: Spot and December, 23.30c. to 23.50c.; January and February, 23c. to 23.35c.; March and April, 23c. to 23.25c. Closing London prices were £105 5s. for spot and £104 for futures. There was very little trading for either consumptive or speculative account. Thus far this month arrivals aggregate 2362 tons. About 1000 tons are due for the balance of this month. Singapore has followed the London decline and there is a disposition to sell.

**Copper.**—Another reduction in price was made since our last writing. The market is now quoted by the chief selling interest at 13c. for Lake, 12⅞c. for Electrolytic and 12½c. for Casting. During the last two or three days rumors were rife that spot Lake was being sold at 12c., and future delivery at figures even lower. Every day these rumors have become more persistent, and the trade momentarily expect a further reduction. It is even held that prices may be cut to 8c. The market is thoroughly unsettled, and no one can foretell what will happen. Transactions were extremely light. The London market continued to drop rapidly, and yesterday it was the lowest, with £47 for spot and £47 15s. for futures. To-day spot closed a little better at £48 10s. for spot and £49 for futures. Since our last writing Best Selected has made sensational declines, in all amounting to £8. At the close to-day it was quoted £56, which, converted into American money, equals about 11¾c. in London. Exports thus far this month amount to 5632 tons, which is small. Imports during the same period foot up to 2622 tons.

**Pig Lead.**—If the cut in price last week was calculated to increase interest in buying, it has failed completely. Exactly the same feeling is prevalent now among consumers of Lead as the Copper consumers have shown for some time. They are more cautious than ever, what faith they had in the stability of prices having been so severely shaken that they engage only according to their absolute and immediate needs. Business has been exceedingly dull. The American Smelting & Refining Company have not yet changed the price they made last week—viz., 4c. for Desilverized, f.o.b. New York, and 3.95c., St, Louis. London has declined still further, closing to-day at £10 3s. 9d.

**Spelter.**—It is quite natural that consumers should be cautious owing to the recent developments in other metals. Business has been considerably easier during the week under review. Spot is quoted 4.30c. to 4.35c. on dock, and shipments from the West are obtainable at 4.30c. St. Louis is down to 4.15c., and London declined to £16 15s.

**Antimony.**—The market remains unchanged, Hallett's being quoted at 8¼c., Cookson's 10¼c., and outside brands 8c.

**Nickel**—Is unchanged, contract prices continuing on a basis of 60c.

**Quicksilver.**—No change has taken place, demand being rather slack, with prices on a basis of $51 per ask of 76½ lbs. in lots of 50 flasks or more. London is quoted £8 17s. 6d.

**Tin Plates.**—The American Tin Plate Company continue to sell for the first quarter of next year on a basis of $4.19 per box of standard 100-lb. Cokes, f.o.b. New York, and $4 f.o.b. mills. Business is fair and the market contains no interesting features.

## The Hope and Menace of American Cities.

### By a British Workman.

BY STUART UTTLEY, SHEFFIELD.

The swarming of the population from rural districts into the great cities is one of the most difficult questions of the age. It is not peculiar to old, congested countries, with a faulty land system, like Great Britain, but is equally observable in States with a large peasant proprietary like France, Germany and Belgium, in paternal States like Russia and in sparsely populated countries like Sweden, Canada and Australia.

The advance of civilization is largely responsible for this migration. The standard of life has risen so rapidly and the social instincts of mankind have become so highly developed, owing largely to the rapid and ready means of communication now existent between city and village hamlet, and equally so between distant continents, that people are not now content to spend their lives in the village or on the old homestead, with its dreary monotony. The letters home from some one more enterprising than the rest, or the visit of one of the most successful in the change from village to city life, has quickened their blood and fired them with a longing for the glitter and glamour of city life, the higher wages, increased facilities for pleasure, the greater freedom from restraint, and, withal, the opportunities afforded for self indulgence, have taken a firm hold, and everywhere we find a vast stream of humanity graduating cityward.

Argument against this tendency is useless. It defies legislation and artificial remedies. At the most it can only be minimized and the inevitable evil effects of overcrowding be lessened by extending the boundaries of great cities and by improving the means of communication with outlying districts whose land is cheaper and fresh air plentiful.

There is much in common between all big cities, whether in the new world or the old. It is true that in the newer American cities there are many miles of villa residences and skyscrapers of wondrous magnitude, electricity in its various forms, and a thousand and one things to minister to the comfort of the wealthy, and yet, with all these indications of wealth and means of comfort, within a stone's throw are to be found overcrowded slums and the inevitable result of the clash and clamor of ever aggressive competition—a loud and continuous wail of hopeless poverty.

#### Overcrowding in Cities.

Inasmuch as the housing of the poor has of late become a burning question in most of our English cities, I naturally turned with interest to New York, with its 3,500,000 inhabitants, in the hope that the second largest city in the world would have succeeded in solving the problem satisfactorily. In many respects I found matters quite as bad here as in London, Glasgow or Liverpool. Up to quite recently housing reformers have devoted their attention to the erection of huge block tenements, and of late years quite a large number have been built in London with more or less success. I was naturally interested in one standing on the East Side of New York City. This block consisted of 39 tenements, con-

taining 605 different apartments, is occupied by 2781 persons, 2315 of whom were over five years of age and 466 under that age. This block contains 260 two-room tenements 179 three rooms, 105 four rooms, 21 five rooms, and only 264 water closets and no bath. Only 40 apartments have hot water, while 441 rooms were dependent for light, air and ventilation upon a narrow shaftlike division running along the center of the block. The rental from this block amounted to $113,964 a year. This block, although erected with a view to improvement, is less sanitary and healthy than the old slum properties in the immediate vicinity. In view of these facts one is constrained to ask what will be the state of things when such buildings have had another 20 or 30 years' more wear and tear? Any one at all acquainted with the frightful state of things prevailing in the great flats in the lower portion of Glasgow may with good reason look forward with dread to the result of the herding together of the mixed peoples in the American cities. The evils of overcrowding are bad enough in the big cities of Europe, but there is every indication that they are being enormously intensified in such cities as New York and Chicago. The American people work under much higher pressure than do those of Europe, and as a result are much more liable to fall victims to the diseases incidental to overcrowding and unsanitary surroundings. This is well illustrated by the fact that whereas the death rate in America generally is much lower than in Europe, the death rate in big cities is higher than that prevailing in London, Paris or Berlin. The death rate of 11 per 1000 from pulmonary consumption is significant to those who know that this terrible disease is fostered by overcrowding. In view of the fact that the general death rate of the largest English towns ranges from 18 to 28 per 1000, of whom only five or six die of chest complaints, this state of things may well be regarded by Americans with a very considerable degree of anxiety.

The intelligent foreigner cannot fail to see much to admire in the great cities of America, yet he is frequently startled at the exceedingly primitive conditions of things (from a sanitary standpoint) prevailing in some of them. The fact that I was so hospitably received and that Americans are rightly proud of their country makes it somewhat difficult to express one's self frankly on this subject without hurting the feelings of a sensitive race; but, after all, it is well for us to understand these matters as seen by others. The path of reform is ever along the lines of truth, and he is our truest friend who kindly points out our weaknesses; hence I doubt not that the evils I indicate will in due course be rectified.

Take Chicago for instance. This city of millionaires is a long way behind the generality of third-rate European cities. Its Mayor recently stated that "among the many things not to-day enjoyed by our citizens, but urged by them, is an increased number of public baths. There is also a demand for emergency hospitals, and the demand for small parks and playgrounds in the congested districts continues." And no wonder when we consider the immense size of many of the tenement dwellings, with little or no playgrounds except the crowded public street, and in the congested districts it is no uncommon experience for the only line of demarcation to be a mark on the floor of the room.

Judge of my surprise, too, to find that Chicago only possesses one destructor plant, capable of disposing of 30 tons of refuse daily. Inasmuch as, according to Mayor Harrison, in the past the "city has followed the barbarous custom of disposing of the garbage in clay holes and on low lying grounds," a great portion of which are now being built upon, it need hardly be said that the people of the Empire City, having sown disease creating refuse so plentifully, are certain sooner or later to reap the harvest in disease and death.

Happily for the future of the citizens, the Health Department is now bestirring itself to counteract the threatened evils. There is now a careful examination of food products and vaccination is strictly enforced, while buildings in course of erection are closely inspected with a view to securing adequate light, ventilation and drainage. Undoubtedly one of the great dangers of the American cities is the matter of the health of the people. While in the city I was very forcibly impressed with the poor quality of the drinking water; drawn direct from the lake, and for the most part unfiltered, it is undoubtedly a great source of danger, and no wonder that typhoid and diphtheria are prevalent. I found quite a number of the better class being supplied with water for drinking purposes from the springs of Wisconsin.

### The Foreign Element.

One other matter which strikes the transatlantic visitor in the American cities is the foreign element. Although this is being gradually assimilated, it is so large and is being so constantly augmented that it is bound to leave its impress on the nation. In New York alone there are over 200,000 Irish and 220,000 Germans. It is also stated that one-fifth of the Russians and one-fourth of the Italians found in the United States live in that city. In other words, over 1,000,000, or one-third, of the population of this commercial capital are foreign born. The proportion of foreigners is even greater in Chicago. Of its population of 1,100,000 in 1890 160,000 were Germans, while the Irish were even more numerous. There were 25,000 Poles and also 25,000 Bohemians. It is indeed well within the mark to say that nearly one-half the inhabitants of Chicago are foreign born.

Although these two cities are extreme cases, every city, with the exception of Washington, has a very great foreign population. In a very real sense they are the hewers of wood and drawers of water for the native Americans, and, though we all know the advantage of the mixing of the races, it is pretty certain that the pure Americans gain little or no benefit from the introduction of low class Russians, Poles, Italians and Germans. There were a large number of Russian and Polish emigrants on board the vessel I came out on, and I could not avoid being impressed by the small stature, poor physique and general low standard of these future citizens of the United States. Providing they had been proposing to settle on the land, then it would have been possible in two or three generations for them to have evolved a fairly passable race, but inasmuch as the great majority foregather in the cities, accentuating the overcrowding and perpetuating the follies and vices of their races, it must be admitted that their introduction on such a large scale, and seeing that, as a rule, they form themselves into colonies in the various towns and cities, constitutes a serious prospective danger to the nation. The Anglo-Saxon has no sympathy with anarchy; he does not understand it. He listens with impatience to its advocacy. On the other hand, the freedom from the arbitrary control which shadowed them in their own country tends to stimulate these opinions, and the cities of America are much more likely to be the strongholds of violent revolutionary opinions than any of the capitals of Europe. So long as trade is good and work is plentiful this element will keep itself within bounds, but should the country be subjected to one of those acute depressions of trade through which, for instance, Germany is now passing, this foreign element is scarcely likely to endure its sufferings with that patience and resignation so characteristic of the Anglo-Saxon race.

### The Organization of Labor.

The organization of labor is quite as necessary for a commonwealth as the organization of capital. In no country in the world is capital so highly organized as in the States. In Great Britain this organization has taken the form of trades unionism, the result being that even in the biggest strikes there is not the slightest hint of a resort to force, and if there has ever been any appearance of riot it has been the result of unwise words or actions on the part of some representative of the capitalists, the influence of the leaders of the men being invariably brought to bear in the interests of peaceable settlements. On the other hand, in France, Germany, Belgium and Italy their organizations take largely the shape of militant social democracy and strong contin-

gents of representatives have been elected to the various Parliaments. Inasmuch as there appears to be little hope of American labor securing representation in Congress, there is reason to fear that it will be compelled in sheer self defense to resort to the most violent agitation, and it will be in the large centers of population where this force will assert itself.

In periods of severe depression the want of organization among the workers will be realized to be a real national calamity. The labor element in the American cities cannot and will not submit quietly to semi-starvation, and, not having any trade union funds to draw upon, will demand either work or money from the local authorities. If this be denied then comes the trouble. In the old country the organized workman can in times of depression fall back upon his trades society, which, coupled with any small savings or credit he can obtain, enables many thousands to tide over a lengthened period of depression. Even the employers of the old country have little conception as to the extent to which the trade society holds the best workmen together and relieves the local rates in times of severe commercial depression. As an illustration, I had the pleasure of presenting, on behalf of his trade society, to a disabled carpenter and joiner the accident benefit of £100, and on reference to the balance sheet of the society I found that they had paid in unemployed benefit £605,701; superannuation, £148,588; sick, £531,966; loss of tools by fire, &c., £50,592, and accident, £51,305, and this is by no means the largest society acting in a similar manner. Even a small local society in one year of severe depression (when thousands of men who had made no provision were either clamoring for charity or on the parish pittance) paid no less a sum than £10,321—in 12 months not one of its unemployed members was compelled to seek other relief. In the States this source of relief is practically nonexistent, hence the danger.

On the whole, it would be manifestly unfair to contrast the cities of the new world with those of the old. When visiting the Pan-American Exposition at Buffalo I saw the inscription, "Eternal vigilance is the price of liberty," and in my tour through the various cities in the States it struck me forcibly that this adage might with advantage be applied to municipal life. In this respect the great majority of American cities have much to learn. It is true that in many the streets are well planned and ample provision is made for growth, but to an old member of one of the most progressive cities in Great Britain their condition, with the exception of a few of the principal streets, was simply abominable, and after a shower in many cases they were perfect quagmires. It required the greatest care to avoid tripping up on the sidewalks; in fact, a similar condition of things in the old country would insure the prompt dismissal of both the officials and members of the Board of Control. One naturally expected to find the principle of municipal control to have made considerable headway in a new country like America. In this I was much disappointed, for although the members of the municipality are dignified by the title of Aldermen and paid for their services, yet I was surprised to find so little done in the way of municipal ownership. Why such a valuable public necessity as the street railways should invariably be in the hands of private companies, and in some cases have so seriously exploited the citizens, was to me a marvel. This and the manifest lack of applied sanitary science led me to the conclusion that the public are too much occupied in looking after their individual concerns to devote any special care and attention to the interests of the community at large, the result being that matters are left in the hands of a small body, with consequent detriment to the public interest. This is in striking contrast to the state of things in the English cities, where, although none of the members are paid for their services, their actions are most keenly watched by the ablest men in the community and where most remarkable progress is being made in public ownership and control.

When an old fashioned Britisher like myself is suddenly dumped down in such cities as Chicago or Pittsburgh he is disposed to draw a doleful conclusion as to their future, seeing as he does health, beauty and sentiment sacrificed to utility, but a little reflection on the fact that, although America has double the population of Great Britain, only about 10,000,000 out of her 80,000,000 people are gathered in 30 large cities, whereas fully 13,000,000 out of the 40,000,000 people in the tight little island are congested in a similar number of towns. The facts speak volumes. They show that America possesses a mighty reserve force in the millions of strong, clear headed workers engaged in agricultural and other pursuits outside the big cities. America has during the last few decades made enormous strides in mechanical development, and when she is fully aroused to the responsibilities of the industrial situation and takes fully in hand the direction and control of municipal life she will at no distant period present a model civilization.

## Iron and Industrial Stocks.

There has not been any marked movement in the iron stocks during the week under review, and values have fluctuated within a relatively narrow range. On the whole, the market has been better as the week progressed.

For the first time U. S. Steel Corporation bonds have appeared on the street, selling at 114 to 114½.

J. P. Morgan & Co. will pay the interest, due January 1, on the series "A" bonds of the United States Steel Corporation.

The coupons due January 1 on the Birmingham division bonds and general mortgage bonds of the Tennessee Coal, Iron & Railroad Company, and on the first mortgage bonds of the Alabama Steel & Shipbuilding Company will be paid at the Hanover National Bank.

The Ansonia Brass and Copper Company, 99 John street, New York City, and Ansonia, Conn., have increased their capital stock from $1,500,000 to $2,000,000.

**Dividends.**—The Chapman Valve Company have declared a regular quarterly dividend of 3 per cent., payable January 1.

The Singer Mfg. Company declared the regular quarterly dividend of 1¾ per cent., payable December 31.

The Colorado Fuel & Iron Company have declared the regular quarterly dividend of 1¾ per cent. on their common stock.

The Washburn Wire Company have declared the regular quarterly dividend of 1¾ per cent. on their preferred stock, payable January 1.

The American Locomotive Company have declared the regular quarterly dividend of 1¾ per cent. on their preferred stock, payable January 21. Books close January 3 and reopen January 21.

## A Dispute About the Price of Heating Steel.

PITTSBURGH, PA., December 24, 1901.—(*By Telegraph.*)—At Youngstown, Ohio, a dispute has arisen as to the proper price to be paid for heating Steel for the 10-inch mill, at the Union Works of the American Steel Hoop Company, and in order to arrive at a proper solution of the question it was decided to refer the matter to the Executive Committee of the Amalgamated Association for the Youngstown district. It is probable that a meeting will be held at an early date between this committee and James H. Nutt, Labor Commissioner of the American Steel Hoop Company, when a settlement of the dispute is expected to be effected. The matter is not of sufficient importance to make it necessary for officials of the Republic Iron & Steel Company or of the American Steel Hoop Company to attend the conference, and they will not be present.

**An Enormous Eye Bar Machine.**—The American Bridge Company have placed with the Bethlehem Steel Company of South Bethlehem an order for what will be the largest eye bar machine in the world. It will have a capacity for making 16-inch eye bars. The recent contract taken by the American Bridge Company for the Wabash bridges over the Monongahela and Ohio rivers calls for 14-inch eye bars, with a 32-inch head. It is to meet this and similar requirements that the machine is to be built.

## The New York Machinery Market.

NEW YORK, December 24, 1901.

One of the prominent machine tool merchants of this city voiced the prevalent sentiment of the trade when he said yesterday, "Judging from the regular business we are doing, we are scarcely aware of the fact that the last week of 1901 is right at hand." It is only natural that no particularly large transactions were made. In this, however, some of the oversanguine are disappointed because they actually believed that some of the large deals pending would be closed to form a part of the records of this year. Correspondence on these subjects by some of the anxious merchants elicited the reply that nothing would be done with the matter this year. The tenor of the replies, however, created a strong impression that the first month's business of next year will be extraordinarily heavy.

As to commonplace trade for standard machines, the business of the week was fine. The year is closing in good style. The total will make a very favorable showing. It has been a successful one for the machinery trade, and the new year will be opened without perturbation. There is enough good business in sight to inspire confidence and insure a prosperous beginning at least of 1902.

### Machine Tools.

The general conditions as outlined in the foregoing are applicable in this particular branch of the trade. As to prices there is but one change reported. It is stated that the Bradford Machine Tool Company of Cincinnati have notified their representatives that the new year would bring with it an advance of about 5 per cent. Parties interested in machine tool matters may be pleased to hear that the Morse Twist Drill & Machine Company of New Bedford, Mass., are reported to be planning for the manufacture of cutters for milling gear teeth. This branch of the industry is receiving a good deal of attention at present, and besides the Boston Gear Works, who have just entered it, we hear of another prominent concern in the East who are preparing to take it up. This party will not only make the styles of cutters now ordinarily used, but have some improved types which they will place on the market. For a long time planers have been about the scarcest of machine tools. This condition is now emphasized owing to the orders that have recently been placed for large lots of the machines. One concern who placed one of these "gang" orders are said to be preparing another list for an equal number. The merchant who obtained the last order is now wondering where the consumer will be enabled to find the machines he is planning for. There is also a dearth of milling machines. A prominent Liberty street merchant who is very enterprising in placing advance orders for the purpose of having a good showing in his warerooms now finds himself without a milling machine in stock. Very reluctantly he was forced to part with the one which added to the attractiveness of his show window.

Theoretically, he is well supplied. That is, he has a large number of the machines ordered from the builder. Those who are ordering milling machines are, however, practical men.

Details are now at hand regarding the proposed improvement of the plant of the Rogers Locomotive Works. Frank P. Holran, treasurer of the company, whose office is at 33 Wall street, New York, informs us that the old Ivanhoe paper mill, which adjoins the Paterson plant, is now being demolished to make room for the new buildings. He said:

"Numerous orders received recently by the Rogers Locomotive Works make expansion a matter of imperative necessity. The new works will be so large that we may turn engines out as rapidly as they are required. Heretofore the crowded condition of the shops has made it necessary in many cases to put locomotives together in the streets adjoining the works, but we do not want to do business in that way.

"We have decided, therefore, to utilize the old Ivanhoe mill property, and our only regret is that it is not twice as big as it is. The old mill will be torn down entirely, and in its place we will build a new erecting shop, which will be 265 feet in length by 100 feet deep, and which will occupy every available foot of ground on the plot which we recently acquired from the city.

"We will also begin at once the erection of an addition to the boiler shop. This will be 80 feet long. The work will be pushed forward as rapidly as possible. Of course, it will take some time to complete these improvements. The next few years will see a great demand for locomotives, and we want to have our plant in shape to do our share of it, and do it in the quickest possible manner. We hope in time to make the Rogers works the largest locomotive plant in the country."

The Kennedy Valve Mfg. Company, whose works are located at Coxsackie, N. Y., and principal offices at 57 Beekman street, New York City, have recently doubled the capacity of their brass foundry. They are now enlarging all the dependent departments proportionately. New machinery is being installed.

The Philadelphia Pneumatic Tool Company of Philadelphia are planning for an extension of their works. Plans are not definitely determined upon as to the size or style of shop that is to be built. At present they are only in the market for power generating machinery. As soon as the new building is completed the subject of machine tools will be considered.

The Structural Steel Car Company, Canton, Ohio, recently organized, have let contracts for the erection of their plant, and building will be commenced at once. The main structure will be 500 x 78 feet, and will represent about half the total floor space. They expect to be turning out cars the latter part of April and will have a capacity of 50 cars per day. The officers are: President, Ellwood C. Jackson, formerly of Jackson & Sharpe, Wilmington, Del.; vice-president, Henry A. Cavnah of Bucher & Gibbs Plow Company, Canton; secretary and treasurer, A. S. Griffin, Canton; general manager, John R. Reed, formerly manager of the wrought iron plant of the American Bridge Company; superintendent, W. H. Woodcock, formerly with the Carnegie Steel Company and American Car & Foundry Company; engineer, R. H. Hornbrook.

The Rutland Railroad Company, Rutland, Vt., have plans prepared for the expenditure of about $1,000,000 in betterments of the property. Included in the improvements to be made are the building of new steel bridges to replace the wooden ones, and the rebuilding and enlarging of their several shops. The company have recently purchased three steam shovels and 100 gondola cars.

### Boilers, Engines and Pumps.

For many months an endeavor has been made to secure electric traction for the city of Tokio, Japan. The chief obstacle was the failure to finance the project. It now apears that satisfactory arrangements have been made and it is evident that the erection of the plant and road will be commenced shortly. Contracts are being let by the Tokio Tetsudo Kabushiki Kwaisha through Mitsui & Co. of 445 Broome street, New York, for the equipment.

At the offices of Mitsui & Co. we are informed that the General Electric Company have secured a blanket contract, valued at about $750,000, for everything outside the piping, valves and fittings, the rails, which are to be purchased in England, and the car bodies, which, owing to the cheapness of wood in Japan, will be manufactured there. The General Electric contract calls for three 1200-kw. G. E. generators, also six rotaries of 400 kw. each. Contracts for the following material they have sublet: Three 1800 horse-power cross compound horizontal McIntosh-Seymour engines, and eight 350 horse-power Babcock & Wilcox boilers. The Blake branch of the International Pump Company will build the pumping and condensing equipments. There will be three main condensing outfits, one pump to be utilized for the exciter engine, two feed pumps and some small equipments for drainage and oil purposes. The heaters will be of Wainwright type. The car trucks, 250, will be made by the Peckham Mfg. Company, whose offices are in the Havemeyer Building. The double motor equipment will be of General Electric build. The Morgan Engineering Company of Alliance, Ohio, are to build

a 20-ton electric crane. The order for piping, &c., has been allotted to Mann & Taylor, of 104-106 John street. It is valued at about $25,000. The road will operate in the principal streets in Tokio. It will be ready to begin operations, it is anticipated, early in 1903. Mr. Enyo, chief engineer of the Japanese company, who has been in the United States for several months, is about to return to Japan. He may be found either at the offices in the Havemeyer Building, 26 Cortlandt street, of McIntosh, Seymour & Co., or at the offices of Mitsui & Co.

Thayer & Co., Incorporated, of 39-41 Cortlandt street, have secured an order for a 300 horse-power Cahall boiler equipment from the Nagasaki Electric Light Company of Nagasaki, Japan. Other contracts are to be placed.

Fox Bros. & Co. of 24 Vesey street, New York, inform us that they will place contracts shortly after the first of next year for the equipment of a 21-mile steam industrial railway, to be constructed in Chile. At a later date contracts are also to be placed for equipment of a machine shop to be used in connection with the road.

The West Virginia Pulp & Paper Company of New York have just placed the contract for the fuel economizer to be used in the new Piedmont plant. The order calls for 6000 horse-power and was awarded to the Green Fuel Economizer Company of 74 Cortlandt street, New York.

The New York, New Haven & Hartford Railroad Company have ordered two 1400 horse-power cross compound condensing engines from the Buckeye Engine Company of 39 Cortlandt street, New York.

Arkell & Douglass of 11 Broadway are purchasing equipment for installation in the De Beers Consolidated Mines at Kimberley, South Africa.

The American Hoist & Derrick Company of 26 Cortlandt street have received an order from the Atlantic, Gulf & Pacific Company of the Park Row Building, New York, for hoists and derricks to be used in connection with the improvement of Manila harbor.

## Cincinnati Machinery Market.

CINCINNATI, Ohio, December 21, 1901.—In the point of new and extensive improvements, Hamilton, Ohio, probably is not outranked by any other manufacturing town in the West. The year 1901 has been specially active in this line, and the improvements now under way and outlined for the coming year run the total pretty well up in the hundreds of thousands of dollars value. The most important thing in the way of an iron working plant established and put in successful operation during the year is that of the American Frog & Switch Company, located on the outskirts of West Hamilton. The company have erected a building 350 x 100, and in addition to this a power plant, and have equipped it with a very extensive line of special machinery adapted for their work. The plant is officered by L. F. Phipps, formerly of the Globe Rolling Mill Company, Cincinnati, president; J. C. Hooven of the Hooven, Owens & Rentschler Company, vice-president; M. E. Dempsey, secretary; E. S. Griffiths, treasurer; E. W. Harden, superintendent, and W. H. Rabbe, engineer. Messrs. Dempsey, Harden and Rabbe were formerly connected with the Wier Frog Company, Cincinnati.

In point of expenditure the largest improvement is that of the new paper mill which is being erected by the Champion Coated Paper Company in West Hamilton. The entire plant when completed will cover about 6 acres of ground, and is one and two stories in hight. Among the very important contracts which they let during the year was one for five complete paper mills to the Black & Clawson Company, Hamilton. The Hooven, Owens & Rentschler Company got the contract for engines to the extent of 4000 horse-power; the McNeal Boiler Works of Akron secured the contract for the boilers; the rotary rag boilers are to be made by the Heine Boiler Company. It is understood that they are in the market now for quite a good deal in the way of machine sundries and supplies. The entire investment in this paper mill will be about $500,000.

The biggest thing contemplated for the coming year in Hamilton is the enlargement of the Hooven, Owens & Rentschler Engine Works. The new foundry is to be 408 x 110 feet, and with the necessary pattern shops and storage. The new machine shop is to be 150 x 370 feet. Both the foundry and the machine shop are to be equipped with 70-foot cranes, each one capable of handling 50 tons. Hitherto the limit has been the ability to build a 2500 horse-power engine. The new shops will be able to turn out Corliss engines as large as 10,000 horse-power. The capital of the concern has recently been increased to $2,000,000, a large portion of the additional money being represented by the proposed improvements.

The Advance Mfg. Company, builders of gasoline engines, whose present shop is located on the ground recently purchased by the Hooven, Owens & Rentschler Company, are preparing to move to much more commodious quarters. They have not yet announced the new location, but expect to decide that point early the coming year. They will remain in Hamilton. The new quarters are to be larger and to represent a greatly increased capacity, and whereas they are now turning out about 30 to 40 engines a month, they expect in their new shops to be able to increase the number to an average of 100. They expect to be in the market for a large amount of shop equipment and supplies at an early date.

The Niles Tool Works report an excellent year just closing, with the feature of trade being the remarkable demand for extra size machines. Among the machines which they have recently constructed and sent out of the shop was a 12-foot planer with a 30-foot table. They also had orders for three 14-foot planers, each with a 30-foot table. These are for export. They are now building several forge lathes 90-inch swing, with 45-foot bed.

The Hamilton Machine Tool Company have had a first rate trade with only one bad feature in the year's business, that being the time lost by the strike last summer. During the year they remodeled their lathes and added a new screw cutting attachment which they expect to attach to all this class of tools they build after the first of the year. They also remodeled their entire line of radial and upright drills, making them heavier in all their parts, and adding quite a new line of improvements, practically making new machines. They have also added a tapping attachment for upright drills. During the year they have increased their capacity by the addition of quite a number of new tools.

The Long & Allstatter Company report the best year they have had in quite a long while, and in spite of the fact that they have been steadily increasing their capacity the close of 1901 finds them almost six months behind with their orders. They have added a building 60 x 100 feet to their shop and put in 10 or 15 new tools.

The Bentel & Margedant Company, makers of wood working machinery, have just equipped and started a foundry to their already extensive plant. They have equipped it with every modern device, and have otherwise added very extensively to their capacity, believing that the outlook justified them.

The largest thing in the way of shop improvement promised for Cincinnati for the coming year is that which is contemplated by the Bullock Electric Company at their Norwood plant. During the past year this company have built and put in operation a shop 250 x 101 feet and otherwise added to their equipment so as to practically double their capacity. The improvement under contemplation at this time includes buildings and equipment, almost if not entirely equal to the plant as it stands to-day, which, when carried to completion, will give the company one of the largest and best equipped machine shops of its class in the United States. They expect to be in the market for the supplies and tools necessary for the new equipment. Hitherto the company have been able to build generators up to 2500 kw. They now propose to increase their ability up to the making of 10,000 kw. machines.

The A. Streit Machine Company, builders of pulley lathes, whose shop at present is located on West Second street, have purchased a tract of ground on Cole-

rain avenue in the northwestern part of the city, and expect some time during the coming year to erect a modern brick shop thereon. They will be in the market for a portion of the necessary equipment, as they expect to largely increase their capacity in the move.

The Cincinnati Screw & Tap Company report business as excellent, and the outlook for a continuation of the present trade sufficiently satisfactory to justify them in making a considerable improvement in their capacity. They have been inquiring for quite a number of new machines recently.

The Wier Frog Company report that owing to the fine trade they have been getting from the interurban roads, as well as the regular trade from the steam lines, they have largely increased their capacity, the requirements being chiefly in the way of heavier appliances, as each year calls for an increase in the weight of their output.

The I. & E. Greenwald Company have recently taken a good sized contract for a coal dredger for the Cincinnati Gas Company. They have also had a very prosperous year in coal washing machinery and in gears.

## The Cleveland Machinery Market.

CLEVELAND, OHIO, December 23, 1901.—There is scarcely a manufacturer or dealer in the machine tool and metal trades in this city but who is fully satisfied with the business of the year 1901. In fact, nearly all report that this has been the best year in their history. That a decline in the general prosperous conditions is not anticipated for several years to come is attested by the fact that nine out of ten of the prominent concerns in this vicinity are either making or have recently made substantial additions to the size and facilities of their shops, while on every hand new concerns are springing up to furnish competition to those who are preparing for more business. December has been one of the best months on record, indicating that the tendency to hold off until another year is less pronounced than in some former years, and this fact, in turn, is indicative that people are too busy, and there is no necessity for curtailing purchases in order to make a good showing for a certain period. Dealers say that only in the case of small supplies is the holding off tendency noticeable, but purchases of machinery and large equipment are going on as usual.

A prominent machinery man who recently visited a number of Eastern cities claims that some of the large machinery dealers are showing a tendency to refrain from placing large stock orders with manufacturers. He says that they propose to keep only a few machines on hand, and allow the manufacturers to carry the stock and risk; their idea evidently being that the era of unexcelled prosperity is showing indications of a let up. The dealer in question says that he shares in the feeling and does not propose to stock as heavily as he did last year.

It is quite evident, however, that local machinery dealers do not look at the situation in this light, since all of them say that they are ordering as heavily as ever before, and that the only difficulty they experience is in securing the machinery to keep in stock. Certain it is that inquiries never were more numerous and seldom have there been so many opportunities of making good sales if prompt deliveries can be made.

The contract for the machine tool equipment of the Lake Shore & Michigan Southern Railroad, Collinwood shops, which has been attracting the attention of local people for several months back, was closed up a few days ago. It was about evenly divided between the Marshall & Huschart Machinery Company, Manning, Maxwell & Moore, the Strong, Carlisle & Hammond Company and the Niles Tool Works.

The Marshall & Huschart Machinery Company have sold a number of tools, including several large Bullard Machine Tool Company's boring mills, to the Westinghouse Electric & Mfg. Company, Walker Works, Cleveland.

Stockholders of the Kilby Mfg. Company have reelected officers, as follows: James W. Lee, president; J. F. Kilby, vice-president, and E. E. Childs, secretary-treasurer. The officers and H. A. Stearns and W. S. Dodge are the directors. In addition to a record breaking amount of sugar machinery work they are just completing a 20,000,000-gallon triple expansion pumping engine for the Cleveland Water Works. The big machine was to have been delivered last October, but their nine months' molders' strike interfered with the work. They are also manufacturing about 500 24-inch water pipe joints for the Risdon Iron Works, to be used in a pipe line under San Francisco Bay for water supply for that city.

The Elwell-Parker Electric Company are very busy on several contracts for large generators and motors. They are at work on two 200-kw. direct connected generators for the Brown Hoisting Machinery Company. Before the latter company's big fire the Elwell-Parker Company occupied part of the Brown plant. It is understood that they are now figuring on erecting a new plant of their own.

The Angell Wire Nail Machine Company, recently organized, have opened a factory on Hamilton street and are manufacturing a wire nail machine, the invention of George Angell, formerly with the National Wire Nail Company, Findlay, and the Salem Wire Nail Company, Salem. It is claimed that the machine will turn out 100 per cent. more nails than similar machines, and with less repair work, and in sizes ranging from 16 gauge up to ⅝ inch. They are building 30 machines for a concern whose name they are not prepared to announce at present. Officers of the new company are W. C. Whitehead, president; George Angell, vice-president, and B. A. Tracy, secretary-treasurer.

The Nunngessor Electric Battery Company have commenced work on a new plant in the East End. It will be 150 x 150 feet and will give them four times their present capacity. They have placed contracts with Brownell & Co., Dayton, for a 100 horse-power automatic engine and boiler of the same capacity. They are buying a number of punches, shears, grinding machines, dies, &c., and are in the market for a lighting plant.

The Cleveland Frog & Crossing Company are increasing the capacity of their power plant, and have placed a contract with Strong, Carlisle & Hammond for two 300 horse-power compound Skinner engines.

The Reade Machinery Company, who are wrecking the plant of the Porter Mfg. Company, Syracuse, N. Y., have sold $10,000 worth of the stock of machine tools within the past ten days. H. R. Drury of the company is in charge of the sale at Syracuse and will remain until the stock is lowered, when the balance will be shipped to the Cleveland warehouse of the company. They have recently purchased a stock of unavailable machinery from the Walker plant of the Westinghouse Electric & Mfg. Company, this city. The stock is in their warehouse and includes gear cutters, slotters, large press, millers, planers, &c. In their new departure, the manufacture of large punches, presses, shears, &c., the Reade Company are meeting with excellent success, and they are building some heavy special tools for prominent people. They will shortly announce something new in metal saws and punches and shears.

The Interstate Foundry Company have let contracts for the structural work for the addition to their foundry to the American Bridge Company. The Shaw Electric Crane Company have the contract for six electric traveling cranes. Kaltenbach & Greiss are engineers for the new foundry addition.

The Standard Machinery & Equipment Company have just sold a large Westinghouse gas engine, direct connected to a generator, to the Cleveland Telephone Company, to be used for auxiliary generating purposes. They are on the market for a second-hand engine lathe, 14 to 16 foot bed and 48-inch swing.

The Garry Iron & Steel Company are working up a good business in pneumatic revolving cranes. They have recently sold a 5-ton pneumatic revolving crane to the Cleveland, Elyria & Western Railway, and a large special pneumatic crane to the Michigan Central Railway.

The Cleveland Crane & Car Company are consider-

ing the erection of a new plant, as their present facilities are altogether too limited to take care of the demands for their cranes. They are building four large cranes for the Pennsylvania Steel Company, Steelton, Pa.; two for the Ridgeway Dynamo & Engine Company, Ridgeway, Pa.; one for the Morse Iron Works, New York; one for City Foundry Company, Cleveland, and several for the Government.

The Parish & Bingham Company, manufacturers of sheet metal stampings, are having plans prepared for a two-story building, 50 x 300 feet, and they will also add another story to their present plant. This improvement has been necessitated through the fact that they have gone into a new line aside from the production of bicycle sprocket wheels, heretofore their chief product. They are now manufacturing large quantities of curry combs and a few days ago made a very large shipment of combs to South Africa for the British army. In the bicycle sprocket line this year they have turned out 500,000 sprockets, which indicates that the independent bicycle manufacturers will produce at least half that many bicycles, none of their business having been with the combine. They are preparing to go into a new line—the production of lithographed tin boxes, for which there is an immense demand. They have recently installed considerable special machinery for this work, and are now occupying the large factory formerly occupied by the O. P. Clay Stampings Company, for this branch of the business. They will buy some new machinery for the new plant, and are on the market for a generator and a number of motors, as they expect to drive all machinery by electricity.

The Cleveland Machine & Mfg. Company have commenced operations in their new factory, just completed. They are figuring on bringing out several new lines of machinery, but at present are engaged in building a number of large rod reels for rolling mills under a contract with the Garret-Cromwell Engineering Company.

Delays in the receipt of structural material, combined with the severe weather, have made progress slow on the new plant of the Brown Hoisting Machinery Company. Work is being pushed as fast as possible, but it is doubtful if the plant will be completed until late next summer. They are extremely busy in their temporary shops on several coal storage outfits for the head of the lakes as well as on several furnace plants.

Improvements which will increase the daily capacity about 25 tons are being made to the plant of the City Foundry Company. A new engine, boiler house, generators, two electric cranes, and another cupola are to be added. The old building is being torn down and a much larger one will be erected in its place.

The Board of Trade of Upper Sandusky, Ohio, has signed contracts which secure for the town the plant of the Marion (Ind.) Machine & Tool Company. The town gave a bonus of $20,000 and 5 acres of land, and the company will commence work at once on a plant to employ 100 men. They will manufacture steam pumps, tire bolting machines, boiler alarms and special machine tools. Under the terms of the contract the plant must be in operation November 1, 1902.

At a public meeting at Norwalk, Ohio, December 18, the last of 500 lots were sold, insuring for that town the carrying out of the project for a large steel plant which has been hanging fire for some months.

The Brown Gas Engine Company of Columbus, and the Cochran Company of Lorain, Ohio, are figuring on a consolidation under the name of the Brown-Cochran Company. The plan is to incorporate with $215,000 capital stock, $115,000 common and $110,000 preferred stock, $50,000 of the preferred stock to be taken by citizens of Lorain, insuring the establishment in that city of a plant for the manufacture of ice machines and gas engines. The stock has been nearly all subscribed, and plans are being prepared for a factory building, 150 x 60 feet.

The Sterling Boiler Company have broken ground for extensive additions to their boiler plant at Barberton. There will be five large new buildings, and when fully completed, it is claimed, it will be the largest boiler plant in the country.

The Thew Automatic Shovel Company of Lorain, Ohio, have let contracts for a 100-foot addition to their automatic shovel plant.

It is announced that General Coxey has completed arrangements for selling $500,000 worth of bonds secured by mortgages on his steel plant and other properties, thus securing capital to fully complete and operate the new steel plant at Mt. Vernon, Ohio. A portion of the plant has recently been placed in operation.

The B. F. Goodrich Company of Akron are calling for bids for the erection and equipment of a five story, 260 x 60 feet, addition to their already large rubber plant.

## Steel Road Track.

WASHINGTON, D. C., December 24, 1901.—The Department of Agriculture has published a bulletin upon the subject of good roads in which is incorporated a large amount of information concerning the actual progress of road construction in this and other countries, including a brief monograph by C. P. Dickinson of Philadelphia on the subject of steel track wagon roads, with regard to which the Department has conducted several investigations in recent years. Mr. Dickinson says: "Steel is the best possible thing for a wheel to roll upon. The same horse power will pull 20 times more on a steel track than on a common dirt road, and five times more than on a macadam road. The steel track will last, without damage or repair, at least five times as long as either. The macadam road cannot be perfect without this steel track laid in it, while under drainage, by the process of laying the track, makes a common road dry all the year around, and with a cinder tread it is dustless, and also noiseless, with no ruts or mud. The automobile and bicycle have come to stay, and must be provided with a suitable track. This steel track is the best possible track for both. The same track that carries the wagon or carriage so perfectly is also perfectly adapted to the bicycle and the automobile. The cost of this steel track is less by one-half than a macadamized road, full width, and less by two-thirds than an ordinary street of brick or stone pavement. The principle of structure in this steel track is such that the least possible amount of steel in any given case is employed, giving complete mastery of the problem of cheapest and best track for all countries and for all time. Under the steel rail is cut a drain, as if for drain tile, say, 3 feet deep, 1 foot of which depth is filled with stones; on top of these stones, where the slotted pillars are to be, is placed the concrete in which the pillars are set. The ditch is then filled with dirt. This gives perfect under drainage under each rail throughout the entire street; hence a dry street or road at all times." W. L. C.

"Progressive prosperity" is a term that well fits the condition of the State of Kansas in the past few years. The latest report of the Kansas State Agricultural Bureau shows that the present has been the best year that the farmers of Kansas have ever known. In spite of the partial failure of the corn crop, the aggregate value of farm products and live stock in the State in 1901 was no less than $348,292,384, or $17,000,000 more than last year, and $45,000,000 greater than two years ago. The season's wheat crop is reckoned at 90,000,000 bushels, which is much larger than any previous wheat crop. While the corn crop was considerably smaller than the average, the falling off in amount was largely counterbalanced by the increase in market value. Corn is now worth about 50 cents a bushel on the farm.

The American Bicycle Company of New York City have formed two branch companies to carry on the business as separate from the parent company whom they represent. The new companies are to be known as the American Cycle Mfg. Company, capital $8,000,000, and the International Motor Cycle Company, capital $2,000,000. The former are to handle bicycles exclusively and the latter the motor business. The capital stock of both companies is to be held by the American Bicycle Company, who will hereafter receive their income in the form of dividends on the stocks of the subcompanies and who will be purely a security holding concern.

# HARDWARE.

## PROFITS IN MANUFACTURING.

It would naturally occur to one at first blush that the greatest profit in the manufacture of Hardware would be in lines that are complex in their nature and that require special talent and equipment for their production; yet, outside of patented articles, such does not seem to be the case. The principal difficulty appears to be that in lines of this nature the demand is comparatively limited, and that consequently the question of tonnage as affecting cheapness of manufacture cannot be considered. On the other hand, the proportion of profit is limited by the fact that the price of such articles largely determines their use, as too high a price interferes seriously with the demand. Against this is the further limitation that such goods are necessarily costly to produce, because of special facilities, expensive machinery and high-priced labor, so that the percentage of profit is not great, considering the limited output, uncertainty of demand and the further limitation as to selling prices.

The manufacture of very staple goods is often regarded as less than promising, yet as a rule they have represented the largest volume of profit. It is true that almost any one can make them, that the margin of profit is small, that competition is severe, and that the goods are sold largely on their price, there rarely being anything specially distinctive in any one make. Yet it is equally true, and herein seems to lie the advantage, that the goods are made economically with cheap labor as a rule, and largely by machinery, that they can be moved in large quantities, and that there is always a demand for them. Success in such goods seems to be partly a matter of location and largely a matter of executive ability. It is certain that the great fortunes in the manufacture of Hardware have been made principally along these lines.

On the other hand, it is undoubtedly true that the manufacturer of special goods of minor importance has often been rewarded with success in building up a profitable business, which, while not always giving a great fortune, has yielded a reasonable competence. Many illustrations of this will occur to the trade where articles outside of the great staples have made for themselves a position in the market, while their manufacture has been attended with substantial profits. Such lines are frequently protected by patents and thus the manufacturer secured in his control of the invention, which, if of merit and successfully placed on the market, may bring in a very satisfactory, and in some cases an ample, income. There are also many instances in which goods of this character make for themselves a permanent place in the favor of the trade because of their superior quality. Many illustrations of the great value of a trade-mark will occur to our readers, even in these days when low price has so much to do with the marketing of commodities. One great advantage connected with the manufacture of specialties as contrasted with staple goods is that an opportunity is afforded for their manufacture on a smaller scale, thus giving parties with less capital a foothold in the market.

## Condition of Trade.

In both mercantile and manufacturing establishments the presence of the holiday season is emphasized in various ways. Manufacturers find a marked falling off in the immediate demands for goods, as the requirements of the trade for the year are presumably covered, and merchants are refraining from buying unnecessarily just before the annual inventory. With the exception of a few belated rush orders for holiday goods the business which is coming to the manufacturers is for the most part for next season, but even this class of buying is limited, and the volume of current business accordingly shows considerable falling off. Few manufacturers, however, regret this. Many of them have only broken stocks in their warehouses, and not a few are seriously behind their orders. An opportunity to get in shape for spring trade is therefore not unwelcome. With local merchants, especially those who go into the finer goods and the lines which receive attention from holiday shoppers, the present season is one of unusual stir and activity, and many report an exceedingly satisfactory business of a type which is more than usually profitable. In anticipation of the passing of the holiday rush, preparations for the annual stock taking are being made, which will show in black and white the results of the year's effort. There is little general change in the tone of the market, so far as prices are concerned. The break in copper will probably have some effect on goods of which this metal is the material, but the market has not as yet taken its proper level, as the trade are waiting to see where the prices of ingot copper will settle. The break is not unwelcome to the trade, as a whole, who have long looked upon it as inevitable, the natural result of an attempt to keep prices at an unreasonable hight. The strength of the iron market is a feature of prime importance in the situation. This tends to give firmness to Hardware lines in general. In a few products, owing to exceptional circumstances, there is some weakness, and there is no doubt that some lines which have been scarce will be in better supply. The year, however, draws to a close with very satisfactory conditions, and with much promise for the new year, in the prosperity of which we trust the readers of *The Iron Age* will have a liberal share.

### Chicago.

(*By Telegraph.*)

The volume of business keeps up remarkably, being augmented at present by the active demand from buyers in the far West, who are taking advantage of the reduced freight rates to lay in stocks of goods for their spring trade. The demand is largely for carload lots of the heavier goods, on which, of course, the greatest saving is being made in freights. It is possible that this may result in a rather quiet condition of trade in January, but that remains to be seen. The traveling salesmen are now coming into headquarters and they invariably give glowing reports of the prospects for business in their territory. A reduction of 10 per cent. has been made in the price of Eave Trough and Conductor Pipe.

## NOTES ON PRICES.

**Wire Nails.**—Wire Nails continue in about the same condition as for the past two or three weeks. The market does not gain strength, notwithstanding the continued high price of Steel. The largest manufacturers continue to protect customers at competitive points, so that recent shipments of Nails have usually been at lower prices than the preceding ones. As a general quotation, $2.05 to $2.10, f.o.b. Pittsburgh, may be named for carload lots. These prices are shaded in some cases where competition requires it.

*New York.*—The demand from store keeps up fairly well, owing, in part, to the fact that local merchants are confining their purchases to small lots of Wire Nails. Prices sympathize with the lower quotations from mill. The market is represented in a general way by the following quotations: Small lots from store, $2.25 to $2.30; carloads on dock, $2.25.

*Chicago, by Telegraph.*—The volume of business in Wire Nails is very heavy, and if prices were governed solely by the demand, values would be advancing. The leading manufacturers have booked a great many orders during the week and report inquiries increasing. Prices have evidently touched a point which appears attractive, when the general conditions of the Steel trade and the very satisfactory situation of general business are considered. The outlook appears to favor a heavier spring trade than usual, for which preparations are now being made. Jobbers report a sustained demand from dealers. Small lots from stock are quoted at $2.25 to $2.30.

*Pittsburgh.*—The condition of the Wire Nail market is about the same as noted in this report for the past two or three weeks. In view of the high prices for Steel and scarcity of that commodity, it is not believed prices of Wire Nails will go much lower than they are now. Demand is only fair and is confined mostly to carloads or smaller lots. We quote Wire Nails in carloads at $2 to $2.05, and small lots at $2.15 to $2.20, depending on order.

**Cut Nails.**—At the monthly meeting of the Cut Nail manufacturers prices were reaffirmed for the month of January. On account of the high price of Steel it was not deemed advisable to make lower prices, especially as it was not considered probable that the demand for Nails would thus be increased. Quotations are as follows, f.o.b. Pittsburgh, plus the actual freight to point of destination, terms 60 days, or 2 per cent. off in 10 days:

| | |
|---|---|
| Carload lots | $2.05 |
| Less than carload lots | 2.10 |

*New York.*—The market for Cut Nails at this point is without change. The demand is moderate. Representatives of mills are adhering to the price of $2.25 for Nails from store. Jobbers are asking the same price generally, but in some instances are selling 2 cents below these figures. New York quotations for carload and less than carload lots are as follows:

| | |
|---|---|
| Carload lots on dock | $2.18 |
| Less than carload lots on dock | 2.23 |
| From store | 2.25 |

*Chicago, by Telegraph.*—The demand for Cut Nails is necessarily confined to narrow limits, because of the low price of Wire Nails. Jobbers quote small lots from stock at $2.35.

*Pittsburgh.*—Demand is being curtailed very much by the low price of Wire Nails, and, in some instances, fixed prices of Cut Nails are being shaded to meet these low prices. Demand is likely to continue light until the building season opens up. We quote for domestic trade, f.o.b. Pittsburgh, plus Tube freight to point of destination, terms 60 days or 2 per cent. off in 10 days:

| | |
|---|---|
| Carload lots | $2.05 |
| Less than carload lots | 2.10 |

**Barb Wire.**—With light demand for Barb Wire and the desire of manufacturers to make sales, regular quotations are not closely adhered to. Concessions in price from 5 to 10 cents per 100 pounds are not infrequently made. Quotations are as follows, f.o.b. Pittsburgh, 60 days, or 2 per cent. discount for cash in 10 days:

| | |
|---|---|
| To jobbers in carload lots, Painted | $2.60 |
| To jobbers in carload lots, Galvanized | 2.90 |
| To jobbers in less than carload lots, Painted | 2.65 |
| To jobbers in less than carload lots, Galvanized | 2.95 |
| To retailers in carload lots, Painted | 2.70 |
| To retailers in carload lots, Galvanized | 3.00 |
| To retailers in less than carload lots, Painted | 2.80 |
| To retailers in less than carload lots, Galvanized | 3.10 |

*Chicago, by Telegraph.*—Manufacturers of Barb Wire report their large customers placing heavy orders in anticipation of an active spring trade. The business thus booked during the past week has run up to a heavy tonnage. Jobbers quote small lots at $2.70 to $2.80 for Painted, and $3 to $3.10 for Galvanized, with 5 cents off for carloads.

*Pittsburgh.*—A good deal of tonnage is being placed by makers of fencing, and jobbers are also placing more liberal orders. Concessions in prices of Barb Wire, ranging from $2 to $3 a ton, continue to be made on good orders. The general market is quoted as follows: Galvanized Barb Wire, $2.90 in carload lots to jobbers, and Painted, $2.60. Terms 60 days net, 2 per cent. discount for cash in 10 days, f.o.b. Pittsburgh.

**Plain Wire.**—More prompt deliveries of Plain Wire are being made by the mills. Demand continues good, with some shading of prices. Regular quotations are as follows, f.o.b. Pittsburgh, terms 60 days, or 2 per cent. off for cash in 10 days:

| Base sizes. | Plain. | Galv. |
|---|---|---|
| To jobbers in carload lots | $2.25 | $2.65 |
| To jobbers in less than carload lots | 2.30 | 2.70 |
| To retailers in carload lots | 2.35 | 2.75 |
| To retailers in less than carload lots | 2.45 | 2.85 |

The above prices are for the base numbers, 6 to 9. The other numbers of Plain and Galvanized Wire take the usual advances, as follows:

| | | | | | | |
|---|---|---|---|---|---|---|
| 6 to 9 | Base | | | | $0.40 | extra. |
| 10 | $0.05 | advance | over | base | .40 | " |
| 11 | .10 | " | " | " | .40 | " |
| 12 and 12½ | .15 | " | " | " | .40 | " |
| 13 | .25 | " | " | " | .40 | " |
| 14 | .35 | " | " | " | .40 | " |
| 15 | .45 | " | " | " | .75 | " |
| 16 | .55 | " | " | " | .75 | " |
| 17 | .70 | " | " | " | 1.00 | " |
| 18 | .85 | " | " | " | 1.00 | " |

For even weight bundles, 50 pounds and over, 5 cents per bundle advance on above.

*Chicago, by Telegraph.*—Large contracts are now being placed for Plain Wire by manufacturing consumers. The outlook is excellent for a continued large volume of business. Jobbers quote small lots from stock at $2.20 to $2.25, base.

*Pittsburgh.*—There is a fairly satisfactory demand, larger than usual at this season of the year. Prices continue to be shaded more or less. General quotations are as follows:

| | |
|---|---|
| To jobbers in carload lots | $2.25 |
| To jobbers in less than carload lots | 2.30 |
| To retailers in carload lots | 2.35 |
| To retailers in less than carload lots | 2.45 |

Galvanized Wire up to No. 14 is 40 cents advance on Plain; Nos. 15 and 16, 75 cents advance, and Nos. 17 and 18, $1 advance. Terms are 60 days, with 2 per cent. off for cash in 10 days, f.o.b. Pittsburgh.

**Copper and Brass.**—The price of manufactured Copper and Brass products remains unchanged from last week's reports, with the exception of Wire, both bare and insulated, which, not being controlled by an association, now has followed the decline in ingot Copper, Bare Wire being 14 cents per pound, base, with the usual difference for insulated. Copper and Brass Sheets, Tubes, Rods, Rivets, &c., are still at former figures, although dealers and manufacturers frankly advise their customers to defer purchases except urgent ones until after January 1, when it is expected something more definite will develop, or they are executing orders to be billed after the opening of the new year at reductions, or advances, as the case may be.

**Shot.**—Under date December 17 the manufacturers of Shot announced a material reduction in prices, owing to the changes which have taken place in the cost of raw material. The new prices are as follows, terms net cash 30 days, or 2 per cent. discount for cash in 10 days:

| | |
|---|---|
| Drop Shot, sizes smaller than B, per 25-pound bag | $1.35 |
| Drop Shot, B and larger sizes, per 25-pound bag | 1.60 |
| Buck and Chilled Shot, per 25-pound bag | 1.60 |
| Dust Shot, per 25-pound bag | 2.00 |

Freight is equalized with other Shot manufacturing points. On orders for ton lots and upward an abatement of 10 cents per bag of 25 pounds, or 40 cents per 100 pounds, is made.

**Maple Sugar Goods.**—Chas. Millar & Son Company,

Utica, N. Y., make the following quotations on their line of Maple Sugar Goods. The Sap Spouts are subject to the discounts given, the prices on the other goods being net:

*Ideal Sap Spout.*

No. 1, Tinned, Open Top, per 100.....$1.50
No. 1, Tinned, Closed Top, per 100..... 1.50
Discounts { Open .....25 %
Discounts { Closed .....20 %
Terms, cash 60 days from March 1.

*Todd's Patent Cover for Sap Buckets.*

Each.....6 cents
In crates of 150, per crate.....$6.00

*Sap Buckets.*

| Size. | IC. | IX. | Galv. |
|---|---|---|---|
| 12-quart, per 100..... | $13.00 | $15.00 | $17.00 |
| 15-quart, per 100..... | 15.00 | 17.50 | 19.50 |

F.o.b. Utica.

*Sap Pails.*

| Size. | IC. | IX. | Galv. |
|---|---|---|---|
| 12-quart, per 100..... | $15.75 | $18.00 | $19.50 |
| 15-quart, per 100..... | 18.00 | 20.25 | 22.50 |

F.o.b. Utica.

*Syrup Cans.*

Full gallon, square or round, paneled or plain, with handles, per 100.....$8.25
½-gallon, square or round, paneled or plain, with handles, per 100..... 6.75
F.o.b. Utica.

Twenty-five cents per 100 reduction from list is allowed on Sap Buckets, Sap Pails and Syrup Cans when shipped from factory.

**Eave Trough and Conductor Pipe.**—A reduction of 10 per cent. has recently been made in the price of Eave Trough and Conductor Pipe.

**Cordage.**—The Rope market is quiet at unchanged prices and moderate demand. Quotations vary with different manufacturers, as follows, on a basis of 7-16-inch and larger: Sisal Rope, 8½ to 9¼ cents; Manila Rope, 12¾ to 13 cents, with ¼ cent per pound in large quantities allowed on both kinds of Rope. Owing to a typographical error, which was probably apparent to the trade, the rebate on large quantities of Rope was incorrectly given in our report last week as 1¼ cents per pound, instead of ¼ cent, the correct figure and the regular rebate.

**Glass.**—Reports are conflicting in regard to the probable future of the Glass market, which is dependent upon the position taken by the different combines. It is understood that the outside factories, both East and West, are perfecting arrangements to come in, either with the American Window Glass Company or the Co-operative Federation. It is not yet known whether the Independent Glass Company and the American Window Glass Company will renew their agreement in January or not. If an amicable agreement can be reached between the three combines it is expected an advance will be made in prices. If, on the other hand, no agreement is reached, indications point to lower prices. Demand is light, with irregularities in the following quotations:

| | Discount. |
|---|---|
| Less than car lots from store..... | 90 % |
| Carloads from store..... | 90 and 7½ % |
| Carloads, f.o.b. factory..... | 90 and 12½ % |

**Paints and Colors.**—*Leads.*—Under date of December 20 manufacturers of White Lead, dry or in Oil, Red Lead and Litharge reduced the price in kegs, as follows:

| | Per pound. |
|---|---|
| In lots of 500 pounds and over..... | 6 c. |
| In lots of less than 500 pounds..... | 6½c. |

The extras and terms remain as before. The reduction has been foreshadowed by irregularities in price, which have been caused by the declining of Pig Lead in foreign markets. The future of the Lead market is said to depend upon the price of raw material.

**Oils.**—*Linseed Oil.*—The Linseed Oil market hardened under the influence of higher priced Seed and inquiry for future deliveries. On Monday city crushers advanced prices to 55 cents in lots of five barrels or more, and 56 cents per gallon in lots of less than five barrels. Out of town Oil is held at 54 to 55 cents for Raw.

**Spirits Turpentine.**—The market for Turpentine is firm at this point and demand moderate. The strength of the market is attributed to reports from Savannah, which indicate an active export demand. Local quotations, according to quantity, are as follows: Southerns, 39 to 39½ cents; machine made barrels, 39½ to 40 cents per gallon.

## HARDWARE STORE WINDOW DISPLAY.

BY JAMES COOK SARCHET.

WINDOW displays in most Hardware stores in the smaller towns and cities are not changed often enough, and the goods shown frequently get soiled with fly specks and dust. The mistake in arranging show windows is in not placing the goods so as to attract attention. Goods displayed should be in season and up to date, and arranged so as to call to mind the needs of the hour, thus helping to increase sales. These will more than pay for the time it will take to fix up the windows. People in passing will see, and often purchase at once, what they will not need for weeks to come if the article is called to mind by a nice display.

### Helps to Attractive Displays.

Good shelving and fixtures help to show small goods. Swinging glass shelves make a good display rack, and do not cast as much shadow as wooden shelves. Mechanical Appliances, such as Water and Electric Motors, may at times be advantageously used for running Mechanical Toys, Bicycles or some other form of moving display.

The light in the windows should be the best to be had. Electric lights make the best effects.

Backgrounds for windows should be bright and clean, and changed as often as the window is trimmed. A very good background is made by taking a frame work of wood built to fit the back of the window. Cover this with colored muslin or fancy colored paper on both sides, each side being of a different color, one side perhaps blue and the other red. These can be turned around very easily, and a change thus made in the color of the background.

### Variety in Display.

A variety in display is best. The more goods displayed the better, as a large show of goods will call attention to the large stock kept by the firm. Goods out of season should never be displayed. Goods in season or about to be, should have the first place in all display windows. The window should be changed often and not left to become an eyesore to the public. It should be taken careful care of and dusted every morning. All bright goods should be rubbed to keep them from getting rusty.

### Marking Prices.

Prices should not be put on all goods, as the competitor will be about the first one to learn them, and he will go one better. If it is necessary to mark price on goods have them so low that there will be no danger from the other fellow.

Keep the window so that the public will talk about it. Always have something that is new and up to date to show and it cannot fail but win trade.

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HIBBARD, SPENCER, BARTLETT & Co., Chicago, have decided to increase their capital stock from $500,000, its present amount, to $1,000,000. The increase is to meet the expense of extensions and improvements which they are to make in building new warehouses, to which reference has recently been made in these columns.

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I. H. AMOS will sever his connection with Honeyman Hardware Company, Portland, Ore., on January 1 and will again enter the field as manufacturers' agent. Mr. Amos will shortly pay a visit to the East, reaching Chicago about January 10 and New York a few days later. Those who would desire an interview with Mr. Amos will be accommodated if they communicate with him care of the New York or Chicago offices of *The Iron Age*.

# NOTES ON FOREIGN TRADE.

## BRITISH LETTER.

Offices of *The Iron Age*, Hastings House, Norfolk St., Strand, London, Dec. 14, 1901.

### A Significant Removal.

MARKT & CO., whose offices in Shoe Lane, have been so often the mecca of American exporters, have removed from that address to more extensive and convenient premises at 20 Chapel street, Milton street, London, E. C. The growth of Markt & Co. is to a considerable extent a synopsis of the growth of the American Hardware industry in Great Britain. Just as Charles Churchill & Co. have been the pioneers of the heavier goods, Markt & Co. have pushed the lighter articles. The business was originally founded by the late John Markt about 60 years ago in New York, who, to begin with, made a specialty of Builders' Hardware. He soon found that there was a ready sale for American goods in Europe. About 35 years ago, therefore, he was joined by his brother-in-law, G. Vintschger, and later on by his son-in-law, Albert Pulvermann, and the combination opened up offices in London and Hamburg, and afterward in Paris, Berlin and Brussels. For about 20 years they occupied premises in Upper Thames street, then, as now, the center of the Builders' Hardware trade. The warehouse was filled with nothing but American Builders' Hardware, Agricultural Implements and a large variety of lighter goods. From that point they have always kept growing, until to-day their English trade is divided into eight departments, as follows: Mechanics' Tools, Oil Stones, Machinery, &c.; Builders', Cabinet Makers' and Saddlers' Hardware and Locks, Wooden Ware and House Furnishing Goods, Agricultural Implements, Lawn Mowers, Edge Tools, Hickory and Ash Handles, Arms, Sporting Goods, &c.; Stationers' Hardware and Sundries, Cycle Accessories, Clocks, Watches, Jewelry, Plumbers' Tools, Gas and Steam Fittings.

It should be borne in mind also that Markt & Co., both from their New York and London offices, do a large business in Central and South America, which is, however, controlled by a separate concern, trading under the style of Markt, Struller & Co. On the death of John Markt, 20 years ago, Edward Smith was taken into partnership, but after eight years he retired, and the company was then transferred into a stock company. In England Markt & Co. make it a point to do only with the wholesalers and factors. They employ an efficient staff of representatives, all of whom have practically grown up in the American trade. Their policy is conservative, but their business grows steadily from year to year. Albert Pulvermann, the vice-president of the company, directs the European branches and manages the Hamburg office. Ad. Leewitz is the manager at Paris, while the English concern is under the control of that very energetic gentleman, Hermann Hiller. The growth of Markt & Co. indicates that in days gone by young American houses have found it convenient to sell for cash through the commission houses. Later developments indicate a desire to trade more directly. The London house of Markt & Co. is quite alive to the situation, and its future operations will be watched with keen scrutiny. There is plenty of young blood in the concern, and with the firm's financial standing it is destined still to play a great part in the growth of American Hardware in this country.

### Exhibition at Vienna.

The leading manufacturers of the Vienna Chamber of Commerce, together with representatives of prominent corporations, have determined to hold an exhibition of inventions and novelties in Vienna in the year 1903. All varieties of technical inventions will be included. As the men mostly behind this exhibition are concerned with gas and water, there should be something in it of interest to American exporters.

### The Indian Trade.

Reports from Bombay are on the whole cheerful. The prospects of the crops are good. Indeed, advices on this point are the most cheerful yet received. The freight market is stiffening, and that is a good sign. *The Iron Age* has already announced through its London correspondence that numerous Germans have gone to India in connection with the heavy trades. I have now to announce that a number of German commercial emissaries have been sent to India to study the particular requirements of the bazaars and markets, and to discover in what most expeditious manner the Germans can meet the trade. This, of course, covers Light Hardware. I seldom get any item of information from India or from merchants concerned in the Indian trade which does not strengthen my belief that Americans must seriously tackle this trade.

### The Outlook in Australia.

The imposition of the new Australian tariff seems to have thrown the whole Australian trade into the melting pot. As I pointed out last week, after the heavy shipments prior to the tariff a great shrinkage in exports has taken place. On the other hand reports from Sydney are to the effect that there is equally a shrinkage of business on the Australian Continent. Certain storekeepers are adding to the price of their goods the exact value of the new import duty, while others are only adding a portion of the tariff to original prices. The result is unsettlement and indecision. The metal market in Sydney is strong, the leading brands of galvanized sheets having advanced 20 shillings per ton, Pig Iron is dearer, Fencing Wire, No. 8, has advanced to £9, and No. 10 to £9 15s. The prices of Wire Netting are maintained. In this branch of trade it may be noted that Colonial makers have suffered a great disappointment. They reckoned upon a protective tariff, but the goods were declared free and English and American makers can therefore compete upon equal terms with Colonial makers. At Melbourne pig iron prices are easier. Fencing Wire has fallen to £8 15s. for German No. 8. Barbed Wire maintains its price. On the other hand Tin Plates are largely overstocked. Speaking generally, however, another report says that the purchasing power of the public appears to be only moderate. It is possible that with the advent of a new agricultural season some improvement may come. A point worth the careful notice of American exporters is that the New South Wales and South Australian Railway departments have taken steps to prevent the access of Victorian merchandise in order to protect their own revenue. The result of this is that it is unprofitable for storekeepers in New South Wales and South Victoria to obtain supplies from Melbourne. With all this ebb and flow in the Australian market it is not astonishing that a meeting has been held at Winchester House, London, for purposes of establishing an association for the protection of exporters to Australia. The chairman of the meeting, E. B. Tredwen, said that it was necessary that something should be done to protect the united interests of the trade. The original cause bringing them together was the adoption by the Australian leading brokers of a new bill of lading form for vessels sailing to the colonies, the clauses of which involved new conditions and serious restrictions. It was proposed by this committee to have a fund at its disposal to fight any questions of principle affecting the export trade to Australia. It is stated that similar associations have already been formed by the importers in Melbourne and by the shippers in the American trade.

### The Week's Trade.

The prominent feature of the week's trade has been the purchase by Tin Plate manufacturers in South Wales of German Bars. These Bars have been purchased at from $3 to $4 per ton cheaper than anything that could be obtained in the home market. This means that if the Tin Plate makers are equal to the situation they ought to consolidate their foreign trade. They are still exporting in largely increased quantities to the United States. During the month of November the value of Tin Plates sent to the United States amounted to $500,000, compared with $220,000 in November last year. On the other hand the Tin Plate trade with Germany, Holland, France, Italy, Brazil, Argentina, Australia and New Zealand and Canada has seriously fallen away. Indeed, last month the value of Tin Plates sent to Germany only amounted to $33,000. Taking ad-

vantage of the German crisis in this way of cheap buying, it is just possible that there may be a stronger market for Tin Plates, although, of course, with the settlement of the strike in America the American export trade will naturally fall off. In a general way it is worth noting that the prices of raw materials and coal are now cheaper than they were this time last year. The continued unsettled condition of the copper market is still bad for the Tube and Wire trades. Firstly, in restricting demand to the satisfaction of immediate wants, and secondly in perplexing consumers, who are unable to determine whether to stock or abstain from buying copper at its present market value. The demand for light goods falls far below same period of the last few years. Oversea orders this week have been below the average, but the export business is on the whole fairly steady, although the future, as I have previously remarked, is not hopeful. Our exports of Galvanized Sheets, Wrought Iron Goods, Hardware Implements and Tools have all fallen off, in some cases seriously. In unenumerated Hardware Russia, Sweden, Norway, Germany, Holland, Belgium, France, Brazil, Argentina, East Indies, have all restricted their orders to a serious extent. Builders' Ironmongery is still in a poor way, both for home and shipment, but there is an extensive run on Shipping Tackle. The brass founders are doing very little. The Edged Tool trade is moderately active, while the japanners are busy with season orders, and the Stamped Hollow Ware trade is also busy on export orders. As showing how affairs are tending, Ingall, Parsons & Co. announce a loss on the year's trading of $16,000: Bayliss, Thomas & Co. lose $3500, while Tubes, Limited, declare a loss of no less than $90,000.

## MANUFACTURING INTERESTS OF THE ONEIDA COMMUNITY.

THE ONEIDA COMMUNITY, Kenwood, N. Y., are distributing an attractive pamphlet which gives an interesting history of the establishment and growth of the community and the various important business enterprises that have long been a part of their existence. The engravings, 25 in all, illustrate the humble origin and progressive growth of what is now a well-known institution, with factories in four different places. This enterprise was founded on the community of interest principle in 1848 on the old Indian reservation at Kenwood, N. Y., which is now a part of the town of Oneida. It was composed of a company of New England farmers.

ORIGIN OF THEIR CANNING INDUSTRY.

Their first industry was the raising of fruits and vegetables, which in 1854 took a commercial turn, when one of their number conceived the idea of canning and preserving for the best family trade some of their product. The goods, which are put up both in glass jars and tin cans, according to the nature of them, have come to embrace many choice fruits, vegetables, jellies, jams, fruit juices, poultry, soups and mincemeats, there being a total of 225 varieties. When the experiment was decided on the Community Business Board, after mature deliberation, allowed Mr. Thacker, the originator of the idea, to put up 1000 bottles. Samples were timidly shown a grocery buyer in one of the large cities, who, after a test, said, "I'll take all you've got."

INITIATION OF THE GAME TRAP BUSINESS.

Soon after this they began the manufacture of animal or game Traps, making what is known in the trade as the Newhouse, Hawley & Norton, Victor, All Steel and Star brands, the former in 15 sizes. Sewall Newhouse, one of the community members, a trapper and hunter by instinct and possessed of mechanical skill, was accustomed to hammer out Steel Traps at the community's forge for catching wild game, which was plenty in the surrounding country. These Traps, it was noticed, had a relentless grip and held whatever they caught, so that the neighboring Indians and others began to seek them. Eventually more forges were made and the young men of the community were taught trapping by Mr. Newhouse, and, finally, it was decided to send an agent to Detroit, which was then the fur trading center, with a trunk full of Traps. The Traps were sold as soon as shown, and the transaction was followed by an unexpected letter from the Hudson Bay Company containing an order for a large number. These Traps are made in appropriate sizes to catch such animals as rats, gophers, musk rats, mink, foxes, otters, beavers, wolves, bears and even elephants. One larger than any of those mentioned, for exhibition purposes, is 8 feet long, 33-inch spread of jaws, and the bait pan and ring each 12 inches in diameter, the Trap complete weighing 425 pounds, which, of course, is much larger than required for any existing game.

SEWING SILKS AND THREADS.

In 1866 they began to manufacture a full line of sewing silk, machine, embroidery and button hole twists, and all kinds of silk threads.

SILVER PLATED FLAT WARE.

The manufacture of Silver Plated and Flat Table Ware was begun in 1877, with works at Niagara Falls, N. Y., the capacity of which, we are advised, is now a total of 40,000 pieces a day, an important feature of which is the production of Souvenir Spoons to commemorate special occasions, which is in addition to the manufacture of a large assortment of staple and fancy lines of Knives, Forks and Spoons.

TRAP AND OTHER STEEL CHAINS.

About 1881 they began to make Steel Chains for Traps, and eventually for a great variety of purposes, together with Snaps, Swivels, Dog Collars, &c.

INCORPORATION OF THE PRESENT COMPANY.

In 1880 the Oneida Community were incorporated with a capital of $600,000, the business being placed on the ordinarily accepted commercial basis, and is now known as the Oneida Community, Limited. The officers of the company are:

President, Theodore R. Noyes.

Treasurer, John S. Freeman.

General business manager, Pierrepont B. Noyes.

The general offices, as well as the factories for fruit packing, silk spinning and Trap and Chain making, are at the original point in the neighborhood of Oneida, at Kenwood and Sherrill, N. Y., the latter being only 1½ miles distant, the works for making Silver Plated Ware being at Niagara Falls, N. Y. They also have another factory at Niagara Falls, on the Canadian side, the location of which is an advantage in the production of goods for the Canadian markets. They also have branch houses at 413 Broadway, New York; 79 Dearborn street, Chicago; Ninth and Locust streets, St. Louis, Mo., and 134 Sutter street, San Francisco.

## REQUEST FOR CATALOGUES, &c.

*The trade are given an opportunity in this column to request from manufacturers price-lists, catalogues, quotations, &c., relating to general lines of goods.*

S. J. Thomas, wholesale and retail Hardware, Implements, Furniture, &c., Gainesville, Fla., after January 1 will put in a full stock of Mill and Mining Supplies, and will be pleased to receive catalogues, quotations, &c., from manufacturers in these lines.

## CALENDARS, &c.

F. E. MYERS & BRO., Ashland, Ohio, manufacturers of Pumps and Hay Tools.

WHITMAN & BARNES MFG. COMPANY, 111 Chambers street, New York, manufacturers of Machine Shop, Mill and Factory Supplies.

TAYLOR HARDWARE COMPANY, Allegheny, Pa., dealers in Hardware, &c.: Diary and memorandum book.

STANDARD HORSE NAIL COMPANY, New Brighton, Pa., the new standard Horse Nails.

THE BOURNE-FULLER COMPANY, Cleveland, Ohio, Iron, Steel and Pig Iron.

## RETAIL IMPLEMENT DEALERS' ASSOCIATION.

THE third annual convention of the Retail Implement Dealers' Association of South Dakota, Southwestern Minnesota and Northwestern Iowa was held at Sioux Falls, S. D., on the 10th, 11th and 12th inst., with John Colvin, Mitchell, S. D., president of the association, presiding. The delegates were welcomed on behalf of the city by George W. Burnside, Mayor of Sioux Falls. M. D. Thompson of Vermillion responded on behalf of the association to the address of welcome. D. M. Grove, Nevada, Iowa, secretary of the Implement Dealers' Association of Iowa, who was sent by that association to represent it at the meeting, then addressed the gathering. President Colvin read his annual address, which was listened to with unusual attention. After the appointment of committees the convention resolved itself into a social session and smoker.

Upon the convention being called to order on the following morning, the annual reports of Secretary-Treasurer W. S. Hill, Alexandria, S. D., were presented and adopted. The reports showed the association to be in good condition, both financially and otherwise. "Local Competition" was the subject of a carefully prepared paper read by J. E. Sinclair, Beresford, S. D. The subject was ably discussed by W. H. Wumkes, Lennox, S. D.; J. G. Burghardt, Valley Springs, S. D.; J. J. Nissen, Yankton, S. D., and D. M. Grove, Nevada, Iowa. G. J. Bach of Hurley, S. D., read an interesting paper on "What Benefits Are to be Derived From Being a Member of this Association." This subject was interestingly discussed by K. O. Stakke, Woonsocket, S. D. L. V. Schneider, Salem, S. D., then read a paper on "How Best to Advertise." This was discussed by Jonah Jones, Sioux Falls, who gave the delegates considerable valuable information on this important feature of the Implement business. Harrison White, Luverne, Minn.; W. S. Hill, Alexandria, S. D.; J. J. Nissen, Yankton, S. D.; D. M. Grove, Nevada, Iowa; K. O. Stakke, Woonsocket, S. D., and G. H. Ireland, Newton, Iowa, discussed at length the subject of "Collections."

The session in the evening was a particularly successful one. The commodious hall in which the convention was held was filled to its utmost capacity. The first address was by J. S. Buck, Sioux Falls, on the subject of "The Wholesaler, Retailer and Commercial Traveler."

### W. S. Thomas' Address.

Hon. W. S. Thomas, Springfield, Ohio, president of the National Association of Agricultural Implement and Vehicle Manufacturers, then addressed the gathering. His subject was "Relations that Should Exist Between Manufacturer and Retailer." The address was delivered in a frank, convincing manner, and will have, it is expected, a powerful influence in bringing the dealers of this territory into a closer bond of friendship with the manufacturers. Mr. Thomas presented the manufacturers' position in what to many was a new and clearer light, and the slight prejudice existing in the minds of some dealers was entirely removed by the frankness of his statements. W. H. Miles, Sioux Falls, presented his views on the subject of "Harmony," closing the session.

As soon as the convention was called to order on the morning of the 12th, President Colvin announced that the selection of a place for holding the next annual meeting of the association was in order. Roy Williams extended an invitation on behalf of his city to hold the next annual meeting in Sioux Falls, which, on motion, was accepted with thanks. W. S. Hill, Alexandria, moved that the next annual meeting be held during the first half of December, 1902, at a time to be selected by the Board of Directors. This motion also prevailed.

### Election of Officers.

The report of the Committee on Nominations, which was as follows, was also adopted:

President, M. D. Thompson, Vermillion, S. D.
First vice-president, L. G. Ochsenreiter, Webster.
Second vice-president, V. R. Wadden, Madison.
Third vice-president, W. B. Brown, Pipestone, Minn.
Fourth vice-president, E. C. Lee, Volga.
Fifth vice-president, Roy Williams, Sioux Falls.
Secretary-treasurer, W. S. Hill, Alexandria, S. D.

DIRECTORS: E. F. Gross, Gettysburg, S. D.; Harrison White, Luverne, Minn.; J. J. Conway, Orient, S. D.; L. V. Schneider, Salem, S. D.; K. O. Stakke, Woonsocket, S. D.; W. H. Wumkes, Lennox, S. D.; R. S. Lockhart, Clear Lake, S. D.

FINANCE COMMITTEE: J. J. Nissen, Yankton; Jonah Jones, Sioux Falls; J. D. Bartow, Plankinton.

GRIEVANCE COMMITTEE: E. B. Van Aulstine, Mitchell; J. E. Sinclair, Beresford; W. S. Hill, Alexandria.

The convention then went into executive session, during which the delegates listened to a paper on "Binder Canvassing," by V. R. Wadden, Madison, S. D. At the conclusion of the executive session there was a brief business session, during which the following report of the Committee on Resolutions was presented and adopted:

### Resolutions.

*Whereas*, The present condition of the retail trade in harvesting machinery is such that it is difficult for the dealer to handle it in a manner which is satisfactory to all parties concerned therein, and believing that a united action on the part of the manufacturers thereof would be beneficial to them, to the dealer and to the farmer; be it

*Resolved*, That we hereby request each manufacturer to establish a fixed retail price on his machines and maintain the same to the best of his ability.

*Resolved*, That we further request said manufacturer of harvesting machinery to place agencies for his products only in the hands of regular retail dealers in implements.

*Whereas*, The question of insurance is one of vital importance to the implement dealer; be it

*Resolved*, That the president appoint a committee for the purpose of considering this matter, report to be made at our next annual meeting.

*Whereas*, Our able president and secretary have rendered such efficient work in advancing the interest of our association by giving their time and ability and allowing no opportunity to pass unimproved when they could improve our condition as an association;

*Whereas*, D. M. Grove, secretary of the Iowa Association, rendered so able a talk showing his interest in our work and the welfare of our young association;

*Whereas*, E. J. Mannix, the worthy editor of the *Commercial News;* the people of the Cataract, the city of Sioux Falls, and the members of the Reception Committee, who have left nothing undone to give the best the city could produce, and, last but not least, W. S. Thomas of Springfield, Ohio, president of the National Association of Implement and Vehicle Manufacturers, whose address revealed many points of interest, showing the closer relations of retailer and manufacturer, and brought out many points of interest to every member; and to all others who have given their time and talents in the support of our work; be it

*Resolved*, That a vote of thanks be given and a copy of these resolutions be given to the press for publication, showing forth our appreciation and gratitude for every and all favors shown us by those who are so worthy; be it further

*Resolved*, That this association heartily indorses the French reciprocity treaty now pending before the United States Senate, and requests our Senators to give it their earnest and favorable consideration.

*Resolved*, That our secretary send a copy of the above resolution to the Senators and Congressmen of South Dakota, Minnesota and Iowa.

## PRICE-LISTS, CIRCULARS, &c.

OSHKOSH LOGGING TOOL COMPANY, Oshkosh, Wis.: Catalogue D illustrating their extensive line of Logging and Driving Tools.

THOMAS & LOWE MACHINERY COMPANY, Providence, R. I.: Catalogue and price-list of Armstrong patent Tool Holders.

THE ELLIOTT MFG. COMPANY, Warren, Ill.: Illustrated catalogue of the Elliott one-piece bottom Anti-Rusting Tinware—Pails, Dippers, Tea Kettles, Wash Boilers, Tea Pots, Coffee Pots and Boilers, Measures, Sprinklers, Wash Basins, Milk Pans, Sauce Pans, Preserving Kettles, Oil Cans, &c.

MASSACHUSETTS TOOL COMPANY, Greenfield, Mass.: Catalogue of fine precision tools, including Micrometer Calipers, Micrometer Gauge, Micrometer Surface Gauge, Rules, Straight Edges, Surface Gauges, &c. They call attention to the fact that they have recently purchased the mechanical tool business of Coffin & Leighton, Syracuse, N. Y., and are continuing the manufacture of their tempered Steel Rules, Protractors, &c., having installed the plant in their own factory.

COATES CLIPPER MFG. COMPANY, Worcester, Mass.: Lithographed show card representing their Coates Twentieth Century Clipper, with plier handles and ball bearings.

NORRISTOWN COVERING COMPANY, Norristown, Pa.: Catalogue showing their Steam Pipe and Boiler Coverings, Asbestos Cements, Sectional and Block Coverings, Asbestos Goods, Mineral Wool and Hair Felt.

HUNT, HELM, FERRIS & Co., Harvard, Ill.: Catalogue of Haying Tools, Tank Heaters, Barn Door Hangers, Wire Stretchers, Corn Huskers, &c. The catalogue comprises 96 pages, and presents illustrations and full particulars relative to the large line of Hardware Specialties manufactured by the firm under the Star trade-mark.

J. B. CARROLL, 36 La Salle street, Chicago: Illuminated Christmas greeting circular, calling attention to the Hahn Acetylene Gas Burner. This circular is a noteworthy specimen of fine printing and attractive color work.

WALLINGFORD MFG. COMPANY, Wallingford, Vt.: Catalogue showing their line of Hardware Specialties. Among the goods illustrated are Grass Hooks, Corn Knives, Corn Brakes, Hay Knives, Corn Hooks, Corn Binders, Corn Huskers, Potato Hooks, Lawn and Garden Weeders, Tobacco Knives, &c.

## TRADE ITEMS.

THE WABASH SCREEN DOOR COMPANY, Marquette Building, Chicago, announce to the trade that they have leased the large factory building on the corner of Marshall street and Eighteenth avenue, Northeast, Minneapolis, Minn., formerly known as the Johnson-Hurd Sash & Door Factory. This building is not only large, but particularly well adapted to the business of the company. They regard themselves exceptionally fortunate in having found such a desirable building to enable them to supply the gap in their trade caused by the destruction of their factory at Rhinelander, Wis. The machinery of this factory building is in such shape that with the additions to the equipment to be made at once the company confidently expect to be turning out Screen Doors by January 1. As already announced, the company also expect to be in the market with Stove Boards earlier than usual.

THE HOOD MFG. COMPANY, Carthage, Mo., manufacturers of Self Measuring Faucets, have bought a new building on Main street, into which they will move their manufacturing department. New machinery will be installed and the capacity considerably increased.

THE WILKE MFG. COMPANY, Anderson, Ind., manufacturers of the Plate Glass Interior and White Glazed Tile Refrigerators, have been compelled by the increased demand for their line of goods to build a brick addition, 56 x 156 feet, with a 7-foot basement, to their factory building, to be used for manufacturing and storage purposes, and are now in a better position to fill orders.

JOHN S. BOLTON, Moline, Ill., advises us that he has just purchased all rights, stock and tools pertaining to the manufacture of the American Post Hole Digger. Mr. Bolton also manufactures Ryan's Self Cleaning Post Hole Digger, Wire Tighteners, Clothes Line Tighteners, Stock Waterers, &c. His new building, recently completed, is referred to as placing him in a position to take care of a growing trade.

## DANVILLE BESSEMER COMPANY.

DANVILLE BESSEMER COMPANY, Danville, Pa., are now making both Hollow Back and Plain Back goods and advise us that they are giving careful attention to the workmanship in every detail. When additions which they are now making to their plant are completed, which will be about the middle of next month, their product will reach 150 dozen a day in Hollow Back and 100 dozen in Plain Back goods, and in a short time it is hoped this production will be still further increased. The company's range of shapes and sizes is being rapidly enlarged, so as to as soon as possible cover a complete line of Shovels, Scoops and Spades and Specialties in these goods in Hollow Back, Plain Back and Riveted work. The company will shortly issue a catalogue covering their line.

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## A THANKSGIVING DAY STOVE WINDOW.

A Thanksgiving Day Stove and Kitchen Utensil display that can be made in any store carrying these lines is described in *The Metal Worker* as follows:

This year I intend to have a Thanksgiving Day Stove window, and I intend to trim it so as to attract attention—that, I find, is the most essential feature of any advertising. I have also found that to attract attention without satisfying it is a greater crime than to live and do business in an obscure way. For this year I have prepared a red banner, on which there are white letters stating "Here's the Place to Get Ready for Your Thanksgiving Dinner." This is large enough to stretch across the sidewalk in front of my store, so that no passerby can miss it. I intend to put this out and trim my window on Friday night, November 15. This will attract the attention of the people who come to town from the country on Saturday to do their shopping, as well as that of the school children and shoppers in town. I will have the advantage of two Saturdays previous to Thanksgiving.

I intend to use the Range which I am making my leader as the central feature of my display. This Range has a high shelf, upon which I will put a Tin Bread Pan covered with a towel. On the nickel plated tea shelves I will place on one side a Coffee Pot and on the other a Teapot. On the top of the Stove I will have a nickel plated Tea Kettle and a granite iron Sauce Pan. On the top of the warming shelf, opposite the Bread Pan, I shall put a Corn Popper. From the top of the warming shelf I shall run up a Planished Iron Pipe and place on it one of the fuel saving Smoke Pipe Radiators that are so generally advertised. To this will be attached a placard, saying: "Put It Upstairs. It Will Warm a Chamber." I shall use the lower part for a cast iron Floor Thimble, bearing a card, saying: "No Fires with Our Floor Thimbles." Near the hearth of the Range I shall have a Coal Hod, and by it a Coal Sieve, a Fire Shovel, a Clinker Slicer and one of the convenient Clinker Pickers that are now frequently sold.

I shall also have a good sized Market Basket containing some apples for the apple sauce, and alongside of it a good sized Granite Pan with cranberries for the cranberry sauce. On the opposite side of the window I shall pile up some big golden pumpkins, and lay on top of them some Meat Choppers, suggestive of mince pie. In the oven I shall put some Cake Pans and on the floor, in front of the Range, a large oval Platter, with the Carving Knife and Fork suggestively crossed upon it. Beside it will be a large Roasting Pan for the turkey, and in the Pan a large Basting Spoon. I shall also have Pans of walnuts and shell barks, and on them will display nickel plated Nut Cracks and Nut Picks, also the heavy Japanned Nut Crackers so generally used.

The central feature of the window will be a big turkey bearing a placard, saying: "All this Fuss is Being Made for Me. I Am a Visitor from Bill Jones, the Butcher." Already I have arranged with our butcher to supply me the first week with a turkey with the feathers on, and the next week with a turkey without feathers. This is my plan, and I give it so that anybody else that may want to draw attention to their store and thereby increase their trade for Stoves, Table Cutlery and kitchen equipment, as well as Stove Pipe and Grates and Bricks, may profit by the suggestion.

*A Thanksgiving Day Stove Window.*

## THE PITTSBURGH SHOVEL COMPANY.

THE PITTSBURGH SHOVEL COMPANY, Lewis Block, Pittsburgh, whose new Shovel works, at Leechburg, Pa., were started up about a month ago, will shut down at the end of this month, the concern having made an arrangement with the association by which they discontinue the manufacture of Shovels. This concern had one of the largest and most modern Shovel plants in the country, and its competition was being so keenly felt in the trade that the Shovel Association decided to make an arrangement with the concern to take them out of the market. It is possible the works may be started in the manufacture of some other line of goods.

GEO. W. TROUT & CO., Chicago, bought the entire stock of Screen Doors at the sale of the effects of the failed Rockford Screen Door Company on December 3, comprising about ten carloads. Very few bidders were present, and a low price was made. This proves to have been a very fortunate transaction in view of the destruction of the Wabash Screen Door Company's large factory at Rhinelander, Wis., last week. Trout & Co. also purchased a large quantity of Wire Cloth at the same sale, which was secured at a low price.

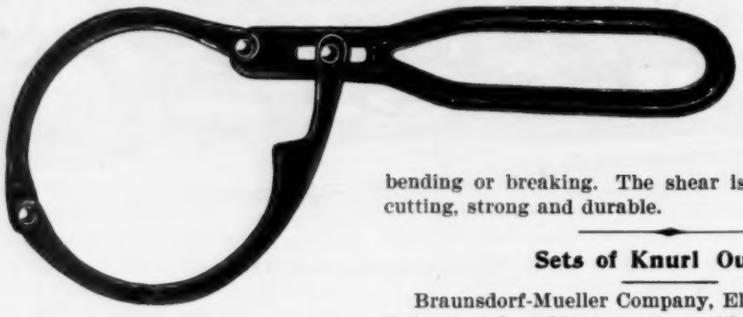
## Eagle Pipe Wrench No. 1.

Frank Mossberg Company, Attleboro, Mass., are offering the pipe wrench shown herewith. It is referred to as being made from best quality of steel forgings, hardened, and taking any size of pipe or nut from ⅛ to ¾ inch in diameter. The wrench is 6 inches long, and weighs 8 ounces. It is alluded to as primarily a pipe wrench, but adapted to a multiplicity of needs, including automobile construction and repair. The wrench is described as requiring no adjustment, being always ready for use on any sized object within the limits of its range; as being instantaneous in grip and letting go when desired, and as simple, effective and convenient.

*Eagle Pipe Wrench No. 1.*

## The U. S. Mason Jar Wrench.

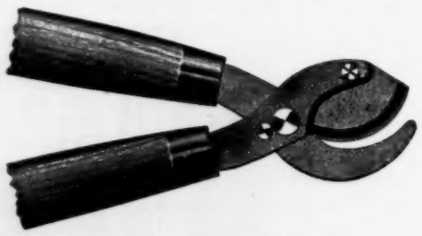
C. A. Powell, 387 Kinsman street, Cleveland, Ohio, is offering the Mason jar wrench herewith illustrated. It is described as being constructed on the lever principle, designed to give an absolute grip and an equal pressure around the cover by means of an adjustable device. The handle is so connected to the claws or rings, it is explained, as to compress them with just sufficient force to overcome any tendency to slip, and yet not grip the cover with more pressure than is necessary, thus obviating the risk of cracking the glass or crushing the cover. It is pointed out that the wrench grips the cover around the top, so that the pressure is sustained by the glass disk, making it impossible to crack or break the jar. It is claimed that with the wrench a jar can easily be sealed air tight, and that no matter how tightly the cover may stick, it can be easily removed without prying under it with a knife.



*The U. S. Mason Jar Wrench.*

## The Ideal Pruner No. 42.

Seymour Smith & Son, Oakville, Conn., John H. Graham & Co., 113 Chambers street, New York, sole agents, are offering the pruner shown in the accompanying illustration. It is made with a detachable blade, which is fastened to the iron body with screws. It is provided with an iron shoulder at the top of the blade to relieve the screws from strain. The hook and blade are joined by a bolt and nut, so may easily be taken apart for sharpening. It is pointed out that the shanks, where they enter the handles, are extra heavy to avoid danger of bending or breaking. The shear is referred to as easy cutting, strong and durable.



*The Ideal Pruner No. 42.*

## Sets of Knurl Outfits.

Braunsdorf-Mueller Company, Elizabeth, N. J., are offering knurl outfits shown herewith. They are put up in substantial hard wood cases, containing 6, 12 and 24 knurls, with adjustable holders. Each case will hold 24 knurls, so that a party buying, say, the assortment of six, can add extra patterns from time to time until the case is filled. Shop men, it is remarked, want their tools within reach, and this arrangement permits any pattern to be selected as easily as a tap or die in a screw cutting set. It is explained that one of these outfits gives a dealer a well assorted line to start with, and that individual knurls may be reordered as fast as sold. The manufacturers state that they have had 12 years' experience in making knurls, and that they are prepared to supply anything in the knurl line.

*Sets of Knurl Outfits.*

# Current Hardware Prices.

## REVISED DECEMBER 24, 1901.

**General Goods.**—In the following quotations General Goods—that is, those which are made by more than one manufacturer, are printed in *Italics*, and the prices named, unless otherwise stated, represent those current in the market as obtainable by the fair retail Hardware trade, whether from manufacturers or jobbers. Very small orders and broken packages often command higher prices, while lower prices are frequently given to larger buyers.

**Special Goods.**—Quotations printed in the ordinary type (Roman) relate to goods of particular manufacturers, who are responsible for their correctness. They usually represent the prices to the small trade, lower prices being obtainable by the fair retail trade, from manufacturers or jobbers.

**Range of Prices.**—A range of prices is indicated by means of the symbol @. Thus 33⅓@33⅓&10% signifies that the price of the goods in question ranges from 33⅓ per cent. discount to 33⅓ and 10 per cent discount.

**Cut Prices.**—*In the present condition of the market there is a good deal of cutting of prices by the jobbing trade, whose quotations are often lower than those of the manufacturers.*

**Names of Manufacturers.**—For the names and addresses of manufacturers see the advertising columns and also THE IRON AGE INDEX SUPPLEMENT (April 4, 1901), which gives a classified list of the products of our advertisers and thus serves as a DIRECTORY of the Iron, Hardware and Machinery trades.

**Standard Lists.**—A new edition of "Standard Hardware Lists" has been issued and contains the list prices of many leading goods.

**Additions and Corrections.**—The trade are requested to suggest any improvements with a view to rendering these quotations as correct and as useful as possible to Retail Hardware Merchants.

### Adjusters Blind—

Domestic, ₱ doz. $3.00....33⅓@33⅓&10%
North's.....10%
Zimmerman's—See *Fasteners, Blind.*

### Window Stop—

Ives' Patent.....25&5%
Taplin's Perfection.....50%

### Ammunition—See *Caps, Cartridges, Shells, &c.*

### Anvils—American—

Arm and Hammer, Wrought ₱ 8¾@8¾¢
Buel Patent Trenton.....₱ lb 9¼@9¾¢
Eagle Anvils.....₱ lb 7¾@7¾¢
Hay-Budden, Wrought.....9@9¼¢
Horseshoe brand, Wrought.....9@9¼¢

### Imported—

Peter Wright's.....9¼@9¾¢

### Anvil, Vise and Drill—

Millers Falls Co., $18.00.....20%

### Apple Parers—See *Parers, Apple, &c.*

### Aprons, Blacksmiths'—

Hull Bros. Co.:
Lots of 1 doz.....35%
Smaller Lots.....30%
Lots of 3 doz.....30%

### Augers and Bits—

*Com. Double Spur.....70@70&10%*
*Boring Machine Augers.....60&10&10@70&10%*
*Car Bits, 12-in. twist.....60@60&10%*
*Jennings' Pattern*
*Auger Bits.....50&10&5@60%*
Ford's Auger and Car Bits.....40&10%
Forstner Pat. Auger Bits.....35%
C. E. Jennings & Co.:
No. 10 ext. lip. R. Jennings' list....40%
No. 30. R. Jennings' List.....50%
Russell Jennings'.....25&10&2½%
L'Hommedieu Car Bits 15&10@15&10&5%
Mayhew's Countersink Bits.....45%
Pugh's Black.....20%
Pugh's Jennings' Pattern.....35%
Snell's Auger Bits.....60%
Snell's Bell Hangers' Bits.....50&10%
Snell's Car Bits, 12-in. twist.....60%
Wright's Jennings Bits (R. Jennings' list).....50%

### Bit Stock Drills—

*Standard List.....65@65&5%*

### Expansive Bits—

Clark's small, $18; large, $26.....50&10%
Lavigne's Clark's Pattern, No. 1, ₱ doz., $26; No. 2, $18.....50&10%
C. E. Jennings & Co., Steer's Pat.....33⅓%
Swan's.....60%

### Gimlet Bits—

*Common Double Cut..gro. $2.25@2.75*
*German Pattern.....gro. $3.25@4.50*

### Hollow Augers—

*Bonney Pattern, per doz. $11.00@11.50*
Ames.....25&10%
New Patent.....25&10%
Universal.....20%
Wood's Universal.....25%

### Ship Augers and Bits—

Ford's.....40%
Snell's.....40%
C. E. Jennings & Co.:
L'Hommedieu's.....15&10%
Watrous'.....40%

### Awl Hafts, See *Hafts, Awl.*

### Awls—

*Brad Awls:*
*Handled.....gro. $2.75@3.10*
*Unhandled, Shouldered..gro. 63@66c*
*Unhandled, Patent.....gro. 66@70c*
*Peg Awls:*
*Unhandled, Patent....gro. $1@1¼c*
*Unhandled, Shouldered..gro. 65@70c*
*Scratch Awls:*
*Handled, Common..gro. $3.50@4.00*
*Handled, Socket..gro. $11.50@12.00*

### Awl and Tool Sets—See *Sets, Awl and Tool.*

### Axes—

*First Quality, best brands. $5.50@5.75*
*First Quality, other brands $5.25@5.50*
*Jobbers' Special Brands:*
*Good Quality.....$4.50@4.75*
*Best Quality.....$5.00@5.25*
*Cheap, Handled Axes.....$5.50@5.75*
*Beveled, add 25c doz.*

### Axle Grease—See *Grease, Axle.*

### Axles—

*Iron or Steel.*
*Concord, Loose Collar....4¼@5c*
*Concord, Solid Collar....4¾@5¼c*
*No. 1 Common.....3¼@3¾c*
*No. 1¼ Com. New Style..3¼@4 c*
*No. 2. Solid Collar.....4¼@4½c*
*Nos. 11 to 14.....70@70&10%*
*Nos. 15 to 18.....75@75&10%*
*Nos. 19 to 22.....75@75&10%*
5% cash 10 days.

### Boxes, Axle—

*Common and Concord, not turned..*
*lb. 4¼@4¼c*
*Common and Concord, turned.....*
*lb. 4¾@5c*
*Half Patent.....lb. 8@9c*

### Balances—Sash—

Caldwell new list.....50%
Pullman's.....60%

### Spring—

*Spring Balances....50&10@50&10&5%*
Chatillon's:
Light Spg. Balances.....40&10%
Straight Balances.....40%
Circular Balances.....50%
Large Dial.....30%
Peerless.....50%

### Barb Wire—See *Wire, Barb.*

### Bars—Crow—

*Steel Crowbars, 10 to 40 lb., per lb..*
*3¼@3c*

### Beams, Scale—

*Scale Beams, List Jan. 12, '97..40&10%*
Chattillon's No. 1.....30%
Chattillon's No. 2.....40%

### Beaters—Egg—

| Standard Co.: | ₱ gro. |
|---|---|
| No. 5 Steel Handle Dover | $6.50 |
| No. 10 Cast Handle Dover | 8.00 |
| No. 10 Steel Handle Dover | 8.00 |
| No. 15 Ex. Hy. Steel Hdl. | 15.00 |
| Rival | 10.00 |

| Taplin Mfg. Co.: | ₱ gro. |
|---|---|
| No. 60 Improved Dover | $6.50 |
| No. 75 Improved Dover | 7.50 |
| No. 75-2 Imp'd Dover, Tin'd | 9.00 |
| No. 100 Improved Dover | 8.00 |
| No. 102 Improved Dover, Tin'd | 9.50 |
| No. 150 Improved Dover, Hotel | 15.00 |
| No. 152 Imp'd Dover, Hotel, T'd | 17.00 |

Lyon's, Standard size.....₱ doz. $1.75
Wonder (S. S. & Co.).....₱ gro. $7.50

### Bellows—

*Blacksmith, Standard List. 70@70&10%*
C. E. Jennings & Co., Blacksmith..60&10%
C. E. Jennings & Co., Hand.....33⅓%

### Blacksmiths—

| *Inch..* | *3* | *3½* | *3¾* | *4* | *4½* | *5* |
|---|---|---|---|---|---|---|
| *Each* | *$3.50* | *3.75* | *4.25* | *4.80* | *5.35* | *6.15* |

*Extra Length:*
*Each..$4.00 4.55 5.10 5.60 6.40 7.50*

### Molders—

| *Inch..* | *9* | *10* | *11* | *12* | *14* | *16* |
|---|---|---|---|---|---|---|
| *Doz...* | *$6.75* | *7.25* | *8.50* | *9.50* | *12.00* | *14.50* |

Net Prices.

### Hand—

| *Inch...* | *6* | *7* | *8* | *9* | *10* | *12* |
|---|---|---|---|---|---|---|
| *Doz....* | *$3.75* | *4.25* | *4.50* | *5.00* | *5.7* | *6.75* |

### Bells—Cow—

*Ordinary goods.....75&5@75&10%*
*High grade.....70@70&10%*
Jersey.....75&10%
Texas Star.....50%

### Door—

Abbe's Gong.....45%
Barton Gong.....55%
Home, R. & E. Mfg. Co.'s.....55&10%
Lever and Pull, Sargent's....40@40&10%
Yankee Gong.....55%

### Hand—

*Hand Bells, Polished.....60&5@55&5%*
*White Metal.....55@55&10%*
*Nickel Plated.....50@50&10%*
*Swiss.....60@60@7½%*
Silver Chime.....33⅓@33⅓&10%

### Miscellaneous—

*Farm Bells.....lb. 2@3½c*
*Steel Alloy Church and School.....*
*50&10&5@60%*
National Bell Foundry Co.:
Superior Cast Steel Church and School Bells.....50&10&5@60%
Wilmot & Hobbs Mfg. Co., Gongs.....70%

### Belting—Rubber—

*Agricultural (Low Grade).75&10@80%*
*Common Standard.....75@75&10%*
*Standard.....70@70&10%*
*Extra.....60&10&5%*
*High Grade.....50&10@50&10&5%*
Boston Belting Co.:
Seamless Stitched, Imperial.....45&5%
Boston.....50&5%
Niagara.....60&5%

### Leather—

*Extra Heavy, Short Lap...50&10@50%*
*Regular Short Lap.....60@60&5%*
*Standard.....60&10@65&10%*
*Light Standard.....65@70%*
*Leather Lacing.....60&10%*

### Cotton—

Rossendale-Reddaway B. & H. Co.:
Sphinx Brand.....60&10%
Durable Brand.....70%

### Bench Stops—See *Stops, Bench*

### Benders and Upsetters, Tire—

Green River Tire Benders and Upsetters.....20%
Stoddard's Lightning Tire Upsetters.....40@50%

### Bicycle Goods—

John S. Long's Son's 1899 list:
Chain.....50%
Parts.....50%
Spokes.....50%
Tubes.....60%

### Bits—

Auger, Gimlet, Bit Stock Drills, &c.—See *Augers and Bits.*

### Bit Holders—See *Holders.*

### Blind Adjusters—See *Adjusters, Blind.*

### Blind Fasteners—See *Fasteners, Blind.*

### Blind Staples—See *Staples, Blind.*

### Blocks—Tackle—

*Common Wooden.....70&10@75%*
Cleveland's Steel.....60&10@70%
Ford's Star Brand Self Lubricating.....60&10%
Hollow Steel, Ford's Pat. Star Brand.....50&10%
Lane's Patent Automatic Lock and Junior.....30%
Stowell's Novelty, Mal. Iron.....50&10%
See also *Machines, Hoisting.*

### Boards Stove—

*Zinc, Crystal, &c.....40&10@..%*

### Bolts—Carriage, Machine &c.—

*Common, list Jan. 30, '95..65&2½@..%*
*Norway Iron, $3.00, list Oct. 7, '84..*
*80@30&5%*
*Phila. Eagle, $3.00 list May 24, '99....*
*80@80&10%*
*Bolt Ends, list Jan. 30, '95...70&5@..%*
*Machine, list Oct. 1, '99.....70&3½@..%*
*Machine with C. & T. Nuts.....*
*65&7½@..%*

NOTE—*The rapid advances in manufacturers' prices enable the jobbers to cut prices freely.*

### Door and Shutter—

*Cast Iron Barrel, Round Brass Knob:*

| *Inch.....* | *3* | *4* | *5* | *6* | *8* |
|---|---|---|---|---|---|
| *Per doz...* | *$0.26* | *.30* | *.39* | *.47* | *.65* |

*Cast Iron Spring Foot:*

| *Inch.....* | *6* | *8* | *10* |
|---|---|---|---|
| *Per doz.....* | *$1.00* | *1.35* | *1.75* |

*Cast Iron Chain, Flat, Japanned:*

| *Inch.....* | *6* | *8* | *10* |
|---|---|---|---|
| *Per doz.....* | *$0.75* | *1.05* | *1.30* |

*Cast Iron Shutter, Brass Knobs:*

| *Inch.....* | *6* | *8* | *10* |
|---|---|---|---|
| *Per doz.....* | *$0.67* | *.80* | *1.00* |

*Wrought Barrel Brass Knob:*

| *Inch.....* | *3* | *4* | *5* | *6* | *8* |
|---|---|---|---|---|---|
| *Per doz....* | *$0.44* | *.50* | *.61* | *.70* | *1.23* |

*Wrought Barrel.....70&10@75&5%*
*Wrought " Bronzed..40&5@50&10%*
*Wrought Flush, B. K..50&10@60&10%*
*Wrought Shutter...40&10&10@60&5%*
*Wrought Square Neck.....50@50&10%*
*Wrought Sunk.....50@50&10%*
Ives' Patent Door.....60%

### Stove and Plow—

*Plow.....60&5@..%*
*Stove.....77½%*

### Tire—

*Common.....77½%*
*Norway Iron.....80@80&5%*
American Screw Company:
Norway Phila., list Oct. 16, '94....82½%
Eagle Phila., list Oct. 16, '94.....85%
Bay State, list Dec. 28, '99.....77½%
Franklin Moore Co.:
Norway Phila., list Oct. 16, '94..82½%
Eagle Phila., list Oct. 16, '94.....85%
Eclipse, list Dec. 28, '99.....77½%
Port Chester Bolt & Nut Company
Empire, list Dec. 28, '99.....77½%
Keystone Phila. list Oct. '94.....85%
Norway Phila., list Oct. '94.....82½%
Upson Nut Co.:
Tire Bolts.....77½%

### Borers, Tap—

*Borers Tap, Ring, with Handle:*

| *Inch.....* | *1¼* | *1½* | *1¾* | *2* |
|---|---|---|---|---|
| *Per doz...* | *$4.30* | *5.00* | *5.75* | *7.25* |
| *Inch.....* | | | *2¼* | *2½* |
| *Per Doz.....* | | | *$8.65* | *11.50* |

Enterprise Mfg. Co., No. 1, $1.35; No. 2, $1.65; No. 3, $2.50 each.....25%

### Boring Machines—See *Machines, Boring.*

### Boxes, Mitre—

C. E. Jennings & Co.....40%
Seavey's, per doz., $30.....40%

### Braces—

NOTE.—*Most Braces are sold at net prices.*
*Common Ball, American...$1.15@1.25*
Barber's.....60&10&10@60&10%
Fray's Genuine Spofford s.....60%
Fray's No. 70 to 130, 91 to 133, 207 to 414.....60%
C. E. Jennings & Co.....60&10%
Mayhew's Ratchet.....60%
Mayhew's Quick Action Hay Patent..50%
P., S. & W. Co Peck's Patent.....60&10@65&5%

### Brackets—

*Wrought Steel.....75&5@75&10%*
Bradley's Wire Shelf:
Full cases.....80%
Broken cases.....75&10%
Griffin's Pressed Steel.....75%
Griffin's Folding Brackets.....70&10%

### Bright Wire Goods—See *Wire and Wire Goods.*

### Broilers—

Wire Goods Co.....75%

### Buckets, Well and Fire—See *Pails*

### Bucks, Saw—

Boss.....₱ gro. $48.00
Hoosier.....₱ gro. $36.00

### Bull Rings—See *Rings, Bull.*

### Butts—Brass—

*Wrought list Sept., '98.....40@40&5%*
Cast Brass, Tiebout's.....50%

### Cast Iron—

*Fast Joint, Broad.....50@50&10%*
*Fast Joint, Narrow.....50@50&10%*
*Loose Joint.....70&5@70&10%*
*Loose Pin.....70&5@70&10%*
*Mayer's Hinges.....70&5@70&10%*
*Parliament Butts.....70&5@70&10%*

### Wrought Steel—

*Table and Back Flaps.....60%*
*Narrow and Broad.....60%*
*Inside Blind.....65&10%*
*Loose Pin.....60&10%*
*Loose Pin, Ball and Steeple Tip.....75%*
Extra 25%
*Japanned, Ball Tip Butts...60%*
*Bronzed Wrt. Nar. and Inside Blind Butts.....45&20@45&25%*

### Cages, Bird—

Hendryx, Brass:
3000, 5000, 1100 series.....5%
1200 series.....33⅓%
200, 300, 600 and 900 series.....40&10%
Hendryx Bronze:
700, 800 series.....40&10%
Hendryx Enameled.....40&10%

### Calipers—See *Compasses.*

### Calks, Toe and Heel—

*Blunt, 1 prong.....per lb..8¾@4c*
*Sharp, 1 prong.....per lb... 4@4¼c*
Perkins' Blunt Toe.....₱ lb 3½¢
Perkins' Sharp Toe.....₱ lb 4 ¢

### Can Openers—See *Openers, Can*

### Cans, Milk—

| | 5 | 8 | 10 gal. | |
|---|---|---|---|---|
| Illinois Pattern. | $1 75 | 2.10 | 2.25 | each. |
| Iowa Pattern... | .... | 2.40 | 2.60 | each. |
| Buffalo Pattern. | .... | 2.30 | 2.50 | each. |
| | 20 | 30 | 40 | qts. |
| New York Patt'rn | 3.00 | 3.25 | 3.40 | each. |
| Baltimore Patt'rn | 2.50 | 2.85 | 3.10 | each. |

### Cans, Oil—

Buffalo Family Oil Cans:

| 3 | 5 | 10 gal. |
|---|---|---|
| $48.00 | 60.00 | 108 gro |

### Caps—Percussion—

*Eley's E. B.....60¢*
*G. D.....per M 32@34¢*
*F. L.....per M 37@40¢*
*G. E.....per M 47@50¢*
*Musket.....per M 57@60¢*

### Primers—

*Berdan Primers, $1.00.....5%*
*B. L. Caps (Sturtevant Shells) $1.00.....5%*
*All other primers.....$1.10@$1 15*

### Carpet Stretchers—See *Stretchers, Carpet.*

### Cartridges—
*Blank Cartridges:*
*22 C. F., $5.50* ..... 10@5@10@10&10%
*38 C. F., $7.00* ..... 10@5@10@10&10%
*22 cal. Rim, $1.50* ..... 10@5@10@10%
*32 cal. Rim, $2.75* ..... 10@5@10@10%
B. B. Caps, Con., Ball Swgd. $1.80@1.85
B. B. Caps, Round Ball... $1.10@1.15
*Central Fire* ..... 25@25@5%
*Pistol and Rifle* ..... 15@5@15@10%
*Primed Shells and Bullets* ..... 15@5@15@10%
*Rim Fire Sporting* ..... 50@50@5%
*Rim Fire, Military* ..... 15@5@15@10%

### Casters—
*Bed* ..... 70@10@70@10&5%
*Plate* ..... 75@10@75@10&5%
*Philadelphia* ..... 75@10@75@10@5%
Boss ..... 70&10%
Boss Anti-Friction ..... 70&10%
Martin's Patent (Phœnix) ..... 45%
Payson's Anti-Friction ..... 70&10&10&10%
Standard Ball Bearing ..... 45%
Tucker's Patent, low list ..... 80%

### Cattle Leaders—
See *Leaders, Cattle.*

### Chain, Coil—
*American Coil, Cask lots:*

| 3-16 | ¼ | 5-16 | ⅜ | 7-16 | ½ | 9-16 |
|---|---|---|---|---|---|---|
| 8.00 | 6.00 | 5.00 | 4.25 | 4.10 | 4.00 | 4.05 |

¾ ⅞ to 1 in. ⅛ to 1¼ inch.
3.85 3.80 3.75 per 100 lb.
*Less than Cask lots add 25c.*
*German Coil, list July 24, '97.* 60&10@10%

### Halters and Ties—
*Halter Chains* ..... 50@10%
*German Halter Chain, list July 24, '97* ..... 60&10@10%
*Cow Ties* ..... 60%

### Trace, Wagon, &c.—
*Traces, Western Standard: 100 pair*
*6½—6-3, Straight, with ring...$30.00*
*6½—6-2, Straight, with ring.. $31.00*
*6½—8-2, Straight, with ring.. $35.00*
*6½—10-2, Straight, with ring..$38.00*
*Add 2¢ per pair for Hooks.*
*Twist Traces 2¢ per pair higher than Straight Link.*
*Trace, Wagon and Fancy Chains..* 50&10@50&10@5%

### Miscellaneous—
*Jack Chain, list July 10, '93:*
*Iron* ..... 60@60&10%
*Brass* ..... 60@60&10%
*Safety Chain* ..... 70&5%@70&10%
*Gal. Pump Chain* ..... lb. 4@4½c
Covert Mfg. Co.:
Breast ..... 35&2%
Halter ..... 35&2%
Heel ..... 35&2%
Rein ..... 35&2%
Stallion ..... 35&2%
Covert Sad. Works:
Breast ..... 70%
Halter ..... 70%
Hold Back ..... 70%
Rein ..... 70%
Oneida Community:
Am. C'ollar and Halters ..... 40@45&5%
Am. Cow Ties ..... 45@50%
Eureka Coll and Halter ..... 45@50&5%
Niagara Coll and Halter ..... 45@50&5%
Niagara Cow Ties ..... 45&5@50&10&5%
Wire Dog Chains ..... 45@50&5%
Wire Goods Co.:
Dog Chain ..... 60&10%
Universal Dbl-Jointed Chain ..... 50%

### Chalk—(From Jobbers.)
*Carpenters' Blue* ..... gro. 42@45c
*Carpenters', Red* ..... gro. 37@40c
*Carpenters', White* ..... gro. 33@35c
*See also Crayons.*

### Chalk Lines—See *Lines.*

### Checks, Door—
Bardsley's ..... 40&10%
Columbia ..... 50&10%
Eclipse ..... 60@60&10%

### Chests, Tool—
American Tool Chest Co.:
Boys' Chests, with Tools ..... 55%
Youths' Chests, with Tools ..... 40%
Gentlemens' Chests, with Tools ..... 30%
Farmers', Carpenters', etc., Chests, with Tools ..... 20%
Machinists' and Pipe Fitters' Chests, Empty ..... 50%
C. E. Jennings & Co.'s Machinists' Tool Chests ..... 20%

### Chisels—
### Socket Framing and Firmer
*Standard List* ..... 70@5@70&10%
Buck Bros. ..... 30%
Charles Buck ..... 30%
C. E. Jennings & Co. Socket Firmer No. 10 ..... 60&10%
C. E. Jennings & Co. Socket Framing No. 15 ..... 60&10%
Swan's ..... 70@5%
L. & I. J. White ..... 30@30&5%

### Tanged—
*Tanged Firmers* ..... 40@5@40&10%
Buck Bros. ..... 30%
Charles Buck ..... 30%
C. E. Jennings & Co. Nos. 101, 181 ..... 25%
L. & I. J. White, Tanged ..... 25&5%

### Cold—
*Cold Chisels, good quality* ..... lb. 13@15c
*Cold Chisels, fair quality* ..... lb. 11@12c
*Cold Chisels, ordinary* ..... lb. 8@9c

### Chucks—
Beach Pat., each $8.00 ..... 30%
Massey's Planer and Milling ..... 15@20%
Skinner Patent Chucks:
Combination Lathe Chucks ..... 40%
Drill Chucks, Patent and Standard ..... 30%
Drill Chucks, New Model ..... 2½%
Independent Lathe Chucks ..... 40%
Improved Planer Chucks ..... 25%
Universal Lathe Chucks ..... 40%
Face Plate Jaws ..... 40%
Standard Tool Co.:
Improved Drill Chuck ..... 45%
Union Mfg. Co.:
Combination ..... 40%
Czar Drill ..... 30%
Geared Scroll ..... 30%
Independent ..... 40%
Union Drill ..... 30%
Universal ..... 40%
Face Plate Jaws ..... 35%

### Clamps—
Adjustable, Hammers' ..... 20@20&5%
Cabinet, Sargent's ..... 50&10%
Carriage Makers', P., S. & W. Co. 40&10%
Carriage Makers' Sargent's ..... 50&10%
Beaty, Parallel ..... 33⅓&10%
Lineman's, Ucica Drop Forge & Tool Co ..... 40%
Saw Clamps, see *Vises, Saw Filers'.*

### Cleaners Sidewalk—
Star Socket, All Steel ..... ₱ doz. $4.00 net
Star Shank, All Steel ..... ₱ doz. $3.75 net
W. & C. Snaur, All steel, 7¼ in. ₱ doz., $3.05; 8 in., $3.10; 8½ in., $3.25.

### Cleavers, Butchers'—
Foster Bros. ..... 30%
New Haven Edge Tool Co.'s ..... 40%
Fayette R. Plumb ..... 33⅓@33⅓&10%
P., S & W ..... 50@50&5%
L. & I. J. White ..... 25%

### Clippers—
Chicago Flexible Shaft Company:
Handy Toilet ..... ₱ doz. $7.20
Mascotte Toilet ..... ₱ doz. $3.40
Monitor Toilet ..... ₱ doz. $9.00
Stewart's Patent ..... ₱ doz. $10.00

### Clips Axle—
*Eagle and Superior ¼ and 5-16 inch* ..... 70@10%
*Norway, ⅜ and 5-16 inch* ..... 70@70@10%

### Cloth and Netting, Wire—See *Wire, &c.*

### Cocks, Brass—
*Hardware list:*
*Compression and Plain Bibbs* ..... 65@5%
*Globe, Kerosene, Racking, &c.* ..... 65@10%
*Cocks* ..... 65@10%

### Coffee Mills—See *Mills, Coffee.*

### Collars Dog—
Brass, Pope & Stevens' list ..... 40%
Embossed, Gilt, Pope & Stevens' list 30&10%
Leather Pope & Stevens' list ..... 40%

### Compasses Dividers, &c.
*Ordinary Goods* ..... 75@75@5%
Bemis & Call Hdw. & Tool Co.:
Dividers ..... 65%
Calipers, Call's Patent Inside ..... 55%
Calipers, Double ..... 65%
Calipers, Inside or Outside ..... 65%
Calipers, Wing ..... 60%
Compasses ..... 50%
J. Stevens A. & T. Co ..... 25&10%

### Compressors Corn Shock—
J. B. Hughes' ₱ doz ..... $2.50

### Conductor Pipe, Galva.—
*L. C. L. to Dealers:*

| Territory. | Not nested. | Nested. |
|---|---|---|
| *Eastern* | 70@2½% | 70@5% |
| *Central* | 65@10% | 70% |
| *Southern* | 65% | 65@2½% |
| *S. Western.* | 60@12½% | 60@15% |

*Terms, 2% for cash.*
*Jobbers receive extra 12½@2½ on carloads loose, and extra 12½ on carloads crated.*
See also *Eave Troughs.*

### Coolers, Water—

| No. | 3 | 4 | 6 |
|---|---|---|---|
| Labrador | $11.50 | $14.00 | $17.50 | $20.00 |

8 gal. $24.00

| No. | 3 | 4 | 6 | 8 |
|---|---|---|---|---|
| Iceland | $23.00 | $25.00 | $30.00 | $37.50 |

10 14 gal. $57.00 $72.00

### Coopers' Tools—
See *Tools, Coopers'.*

### Cord— Sash—
*Braided, Drab* ..... lb. 25c
*Braided, White, Common* ..... lb. 17@18c
*Cable Laid Italian...lb. A, 18c; B, 16c*
*Common India* ..... lb 9 @9¼c
*Cotton Sash Cord, Twisted* ..... 12@16c
*Patent Russia* ..... lb. 12½@13c
*Cable Laid Pussia* ..... lb. 13½@14c
*India Hemp, Braided* ..... lb 14@15c
*India Hemp, Twisted* ..... lb. 10@12c
*Patent India, Twisted* ..... lb. 10@13c
Pearl Braided, cotton ..... ₱ lb 17@18c
Massachusetts, White ..... ₱ lb 22½c
Massachusetts, Drab ..... ₱ lb 26½c
Eddystone Braided Cotton ..... ₱ lb 19c
Harmony Cable Laid Italian ..... ₱ lb 18c
Oswawan Mills:
Crown, Solid Braided White ..... ₱ lb 22c
Braided, Giant, White ..... ₱ lb 20c
Peerless:
Cable Laid Italian ..... 16c
Cable Laid Russian ..... 14c
Cable Laid India ..... 12c
Braided India ..... 18c
Phœnix, White ..... 19c
Samson, Nos. 7 to 12:
Braided, Drab Cotton ..... ₱ lb 32½c
Braided, Italian Hemp ..... ₱ lb 32½c
Braided, Linen ..... ₱ lb 40c
Braided, White Cotton, Spot ..... ₱ lb 28½c
No. 6 cords, 1¢ extra.
Silver Lake:
A quality, Drab, 40c ..... 15%
A quality, White, 35c ..... 15%
B quality, Drab, 35c ..... 15%
B quality, White, 30c ..... 15%
Italian Hemp, 40c ..... 15%
Linen, 57½c ..... 15%

### Wire, Picture—
*Braided or Twisted* ..... 85c&10%
*Note.—There is a good deal of confusion in lists, some using old list and others the new list.*

### Corn Knives and Cutters—See *Knives, Corn.*

### Corn Planters—
See *Planters, Corn—*

### Crackers, Nut—
Little Giant ..... ₱ gr. $34.00

### Cradles—
*Grain* ..... 50%

### Crayons—
*White Round Crayons, gross 5¼@6c*
*Cases, 100 gro., $4.50, at factory.*
D. M. Steward Mfg. Co.
Metal Workers' Crayons, gr. $2.50
Soapstone Pencils, round, flat or square ..... gr. $1.50
Rolling Mill Crayons ..... gr. $2.50
Railroad Crayons (composition) gr. $2.00
Case lots 20%
See also *Chalk.*

### Creamery Pails—See *Pails, Creamery.*

### Crooks, Shepherds'—
Fort Madison, Heavy ..... ₱ doz. $7.00
Fort Madison, Light ..... ₱ doz. $6.50

### Crow Bars—See *Bars, Crow.*

### Cultivators—
Victor Garden ..... ₱ doz. $10.00

### Cutlery, Table—
International Silver Company:
No. 12 Medium Knives, 1847... ₱ doz. $3.50
Star, Eagle, Rogers & Hamilton and Anchor ..... ₱ doz. $3.00
Wm. Rogers & Son ..... ₱ doz. $2.50
Simeon L. & Geo. H. Rogers Company:
12 dwt Medium Knives ..... ₱ doz. $3.00
No. 77 Medium Knives ..... ₱ doz. $2.50

### Cutters— Glass—
H. H. Mayhew Co ..... 40%
Smith & Hemingway Co ..... 50%

### Meat—
*Hale's...Nos. 11 & 111 12 & 112 13 & 113*
*Per doz .. $9.50 12.50 16.00*
American ..... 30%

| Nos. | 1 | 2 | 3 | 4 | 8 | 5 |
|---|---|---|---|---|---|---|
| Each | $5 | $7 | $10 | $25 | $50 | $60 |

Connecticut ..... 50%

| No. | 20 | 40 | 60 | 8 | 10 | 12 |
|---|---|---|---|---|---|---|
| Each | $1.75 | 2.00 | 2.25 | 3.00 | 3.00 | 4.00 |

Enterprise ..... 25@25&7½%

| Nos. | 5 | 10 | 12 | 22 | 32 |
|---|---|---|---|---|---|
| Each | $2 | $3 | $2.50 | $4 | $6 |

Dixon's, ₱ doz ..... 30&10@40%

| Nos. | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| | $14.00 | $17.00 | $19.00 | $30.00 |

Home No. 1, ₱ doz. $22.75 ..... 50&10%
Little Giant, ₱ doz ..... 33⅓&5@40%

| Nos. | 305 | 310 | 312 | 320 | 322 |
|---|---|---|---|---|---|
| | $35.00 | $48.00 | $44.00 | $74.00 | $68.00 |

Sterling ..... 33⅓&5%

| Nos | 1 | 2 |
|---|---|---|
| Each | $3.00 | $2.50 |

New Triumph No. 605, ₱ doz. $24.00 ..... 30&10@40%
Woodruff's, ₱ doz ..... 30&10@40%

| Nos. | 100 | 150 |
|---|---|---|
| | $15.00 | $18.00 |

Chadborn's Smoked Beef Cutter, ₱ doz. $60.00
Enterprise Beef Shavers ..... 25@30%

### Slaw and Kraut—
Henry Disston & Sons:
Slaw, Corn Grater, &c ..... 40%
Kraut Cutters 24 x 7, 26 x 8, 30 x 9 ..... 55%
Kraut Cutters 36 x 12, 40 x 12 ..... 40%
Tucker & Dorsey Mfg. Co.:
Kraut Cutters ..... 40%
Slaw Cutters, 1 Knife, ₱ gr. ..... $18@$30
Slaw Cutters, 2 Knife, ₱ gr. ..... $22@$36

### Tobacco—
*All Iron, Cheap* ..... doz. $4.25@$4.50
Enterprise ..... 25@50%
National, ₱ doz. $21.00 ..... 40%
Sargent's, ₱ doz., No. 2 ..... 45&10%
Sargent's No 3 and 21 ..... 60&10%

### Washer—
Appleton's, ₱ doz. $16.00 ..... 50&10&10%
Bonney's ..... 40%

## Diggers, Post Hole, &c.—
Dalbey Post Hole Auger...per doz. $9.00
Iwan's Improved Post Hole Auger ..... 40%
Iwan's Perfection Post Hole Digger ..... ₱ doz. $9.00
Kohler's Universal ..... ₱ doz. $14.00
Kohler's Little Giant ..... ₱ doz. $14.00
Kohler's Hercules ..... ₱ doz. $12.00
Kohler's Invincible ..... ₱ doz. $10 00
Kohler's Rival ..... ₱ doz. $9.00
Kohler's Pioneer ..... ₱ doz. $9.00
Never-Break Post Hole Diggers, ₱ doz. $24.00 ..... 60%
Samson, ₱ doz. $34.00 ..... 25%

### Dividers—See *Compasses.*

### Dog Collars—See *Collars, Dog.*

### Door Checks—
See *Checks, Door.*

### Door Springs—
See *Springs, Door.*

### Doors, Screen—
Porter's Plain, No. 6 ..... ₱ doz. $8 50
Porter's Ornamental, No. 70. ₱ doz. $10.00

### Drawers, Money—
Tucker's Pat. Alarm Till No. 1, ₱ doz. $15; No. 2, $15; No. 3, $12; No. 4, $18.

### Drawing Knives—
See *Knives, Drawing.*

### Drills and Drill Stocks—
*Common Blacksmiths' Drill...each $1.50@$1.75*
*Blacksmiths' Self-feeding.....each $3.75@4.00*
Breast, Millers Falls, each $3.00 .15&10%
Breast, P., S. & W ..... 40@40&5%
Goodell Automatic Drills..40&5@40&10%
Johnson's Automatic Drills Nos. 2 and 3 ..... 16⅔%
Johnson's Drill Points ..... 25&10%
Ratchet, Curtis & Curtis ..... 25%
Ratchet, Parker's ..... 40%
Ratchet, Weston's ..... 30@25%
Ratchet, Whitney's, P. S. & W ..... 50%
Whitney's Hand Drill, No. 1, $10.00; Adjustable, No. 10, $12.00 ..... 33⅓%

### Twist Drills—
*Standard List* ..... 60@5@65@5%

### Drill Bits or Bit Stock Drills—See *Augers and Bits.*

### Drill Chucks—See *Chucks.*

### Dripping Pans—
See *Pans, Dripping.*

### Drivers, Screw—
*Screw Driver Bits...per doz. 45@70c*
Baisey's Screw Holder and Driver, ₱ doz. 2½-inch, $6; 4-in., $7.50 6-in., $9..40%
Buck Bros. ..... 30%
Buck Bros' Screw Driver Bits ..... 30%
Champion ..... 40&10%
Douglass Mfg. Co ..... 20@20&10%
Fray's Hol. H'dle Sets, No. 3, $12.00 50%
Gay's Double Action Ratchet ..... 33%
Goodell's Automatic ..... 50&10&10@50&10&10&5%
Mayhew's Black Handle ..... 50%
Mayhew's Monarch ..... 40&10%
New England Specialty Co ..... 50&10%
Sargent & Co.'s:
Nos. 1, 50, 55 and 60 ..... 50&10&10%
Nos. 20 and 40 ..... 64⅔&10%
Smith & Hemenway Co ..... 40&5%
Stanley's R. & L. Co.'s:
No. 64, Varnished Handles ..... 60&10%
No. 88 ..... 70&10%
Swan's:
Nos. 65 to 68 ..... 50%
No. 40 ..... 40&10%
Nos. 25, 35 and 45 ..... 20&10&10%

### Eave Trough Galvanized

| *Territory.* | L. C. L. | |
|---|---|---|
| *Eastern* | 75@10% | Carloads extra 12½% |
| *Central* | 75@7½% | |
| *Southern* | 70@12½% | |
| *S. Western* | 70@10% | |

*Terms, 2% for cash.*
See also *Conductor Pipe and Elbows.*

### Egg Beaters—See *Beaters, Egg*
### Egg Openers—
See *Openers, Egg.*

### Elbows and Shoes—
*Factory shipments* ..... 60@60&10%
Perfect Elbows (S. S. & Co.) ..... 30%

### Emery, Turkish—

| | 4 to 16 | 5 to 150 | Flour |
|---|---|---|---|
| *Kegs* ..... lb. | 5c | 5½c | 5½c |
| ½ *Kegs* ..... lb. | 5½c | 5¾c | 5¾c |
| *Kegs* ..... lb | 5c | 6c | |

*10-lb cans, 10 in case* 6½c 7c 6c
*10-lb. cans, less than* 10 10c 10c 8c
NOTE.—*In lots 1 to 3 tons a discount of 10% is given.*

### Enameled and Tinned Ware—See *Ware, Hollow.*

### Escutcheon Pins—
See *Pins, Escutcheon.*

### Extractors, Lemon Juice—See *Squeezers, Lemon.*

## Fasteners, Blind—
Zimmerman's ..... 50&10%

### Faucets—
*Cork Lined* ..... 70@5@70@10@5%
*Metallic Key, Leather Lined* ..... 70@70@10%
*Red Cedar* ..... 50@50@10%
B. & L. R. Co.:
Lockport, Metal Plug, reduced list 60&5%
Star ..... 60@60&5%
Star, Metal Plug new list ..... 40@40&5%
West's Lock, Open and Shut Key 50&10%
John Sommer's Peerless Tin Key ..... 40%
John Sommer's Boss Tin Key ..... 50%
John Sommer's Victor Metal Key. 50&10%
John Sommer's Duplex Metal Key ..... 60%
John Sommer's Diamond Lock ..... 40%
John Sommer's I. X. L. Cork Lined ..... 50%
John Sommer's Reliable Cork Lined ..... 50&10%
John Sommer's Chicago Cork Lined.. 60%
John Sommer's O. K. Cork Lined ..... 50%
John Sommer's No Brand, Cedar ..... 50%
John Sommer's Perfection Cedar ..... 40%
McKenna, Brass:
Burglar Proof, N. P ..... 35%
Improved, ¾ and ⅞ inch ..... 35%
Self Measuring:
Enterprise, ₱ doz. $36.00 ..... 40&10%
Lane's, ₱ doz. $36.00 ..... 40&10%
National Measuring, ₱ doz. $36.00... 40%

### Felloe Plates—
See *Plates, Felloe.*

### Files—Domestic—
*List revised Nov. 1, 1899.*
*Best Brands* ..... 70@75@5%
*Good Brands* ..... 75&10@75@10@10%
*Fair Brands* ..... 80@80@10%
*Second Quality* ..... 50@10@30@25%

### Imported—
*Stubs' Tapers, Stubs' list, July 24, '97* ..... 25%

### Fixtures, Grindstone—
*Net Prices:*

| *Inch....* | 15 | 17 | 19 | 21 | 24 |
|---|---|---|---|---|---|
| *Per doz.* | $2.50 | 2.75 | 3.00 | 3 50 | 4.50 |

P., S. & W. Co ..... 50@50&5%
Reading Hardware Co ..... 60%
Sargent's ..... 60&10&10%
Stowell's Giant Grindstone Hanger ..... ₱ doz. $6.00
Stowell's Grindstone Fixtures, Extra Heavy ..... 50&10&10%
Stowell's Grindstone Fixtures Light ..... 60&10%

### Fodder Squeezers—
See *Compressors.*

### Forks—
*Sept. 1, 1900, list.*
*Grain or Barley Forks, 18 to 20 inches* ..... 70@6% Extra 10&5%
*Hay, 2 tine* ..... 65%
*Hay, 3 tine* ..... 66⅔%
*Hay, 4 tine, Header and Barley Forks, 13 to 16 inches* ..... 66⅔%
*Manure, 4 tine* ..... 70%
*Manure, 5 and 6 tine* ..... 70%
*Spading* ..... 70@5%
Iowa Dig-Eze Potato ..... 65%
Victor, Hay ..... 66⅔%
Victor, Manure ..... 70%
Victor, Header ..... 60&10%
Champion, Hay ..... 66⅔%
Champion, Manure ..... 70%
Columbia, Hay ..... 66⅔&5%
Columbia, Manure ..... 70%
Columbia, Spading ..... 70%
Hawkeye Wood Barley 4 tine ₱ doz. $5.00; 6 tine, $6.00.
W. & C. Potato Digger ..... 65%
Acme Hay ..... 60&10&7½%
Acme Manure, 4 tine ..... 60&20&10%
Acme Manure, 6 tine ..... 66⅔&10&2%
Dakota Header ..... 65&15&5%
Jackson Steel Barley ..... 65&15&5%
Kansas Header ..... 66⅔%
W. & C. Favorite Wood Parley 4 tine, ₱ doz., $5.00; 6 tine, $6.00
Plated.—See *Spoons.*

### Frames—Saw—
*Red, Polished and Varnished...doz. $1.15@$1.35*
*White* ..... doz. 75@80c

### Screens and Frames—
See *Screens.*

### Freezers Ice Cream—

| *Qts...* | 2 | 3 | 4 | 6 | 8 | 10 |
|---|---|---|---|---|---|---|
| *Best* | $1.45 | 1 65 | 1.95 | 2.40 | 3.80 | 4.30 |
| *Good* | $1 25 | 1.40 | 1.70 | 2.15 | 2.75 | 3.75 |
| *Fair* | $1.00 | 1.10 | 1 50 | 1.75 | 2.25 | 2.90 |

### Fruit and Jelly Presses—
See *Presses, Fruit and Jelly.*

### Fry Pans—See *Pans, Fry.*

### Fuse—
*Per 1000 Feet.*
*Hemp Fuse* ..... $2.60 Less 5%
*Cotton Fuse* ..... 2.90
*Single Taped Fuse* ..... 3.25
*Double Taped Fuse* ..... 4.20
*Triple Taped Fuse* ..... 5.00

## Gates, Molasses and Oil—
Stebbins' ..... 50@50&10%

## Gauges—
*Marking, Mortise, &c.* ..... 55&10@55&10@10%
Barrett's Comb. Roller Gauge ..... ₱ doz. $6.75@7.25
Stanley R. & L. Co.'s Butt & Babbet Gauge ..... 20&10%
Wire, Brown & Sharpe's ..... 25%
Wire, Morse's ..... 25%
Wire P. S. & W. Co ..... 30@30&10%

## Gimlets— Single Cut—
*Nail, Metal, Assorted gro.* $1.40@1.60
*Spike, Metal, Assorted gro.* $2.80@3.25
*Nail, Wood Handled, Assorted, gro.* $1.75@2.00
*Spike, Wood Handled, Assorted gro.* $2.25@3.50

## Glass, American Window
*Jobbers' List, Jan. 21, 1901.*
*Less than Car Lots from Store* ..... 90%
*Carloads from Store* ..... 90&7½%
*Car Lot Consignments, f.o.b. factory* ..... 90&12½%

## Glue—Liquid, Fish—
*List A, Bottles or Cans, with Brush.* ..... 37½@50%
*List B, Cans (½ pts., pts., qts.)* ..... 33⅓@48%
*List C, Cans (½ gal., gal.)* ..... 25@45%
International Glue Co. (Martin's) ..... 40&10@50%

## Glue Pots—See *Pots, Glue.*

## Grease, Axle—
*Common Grade* ..... *gro.* $5.00@6.00
Dixon's Everlasting ..... 10-lb pails, ea. 85¢
Dixon's Everlasting, in bxs. ₱ doz. 1 lb $1.20; 2 lb $2.00
Snow Flake: 1 qt. cans per doz. $2.00; 2 qt., $3.20; 1 gal. cans per doz. $6.00; 3 gal. $16.00; 5 gal. $24.00 } 10%

## Grindstones—
Bicycle Emery Grinder ..... $6.50
Bicycle Grindstones, each ..... $2.50@3.00
Pike Mfg. Co: Improved Family Grindstones, per inch, per doz. .. $2.00 } 33⅓%
Pike Mowe Knife and Tool Grinder, each ..... $6.00 }
Velox Ball Bearing, mounted, Angle Iron Frames ..... each, $3.25

## Guards, Snow—
Cleveland Wire Spring Co.: Galv. Steel ₱ 1000 ..... $9.00
Copper ₱ 1000 ..... $18.00

## Gun Powder—See *Powder.*

## Hack Saws—See *Saws.*

## Hafts, Awl— *gro.*
*Peg Patent, Leather Top* ..... $4.90@5.25
*Peg Patent, Plain Top* ..... $3.50@3.75
*Sewing, Brass Ferrule* ..... $1.50@1.60
*Saddlers', Brass Ferrule* ..... $1.35@1.45
*Peg, Common* ..... $1.25@1.35
*Brad, Common* ..... $1.50@1.75

## Halters and Ties—
Covert Mfg. Co.:
Web ..... 45&2%
Jute Rope ..... 45&2%
Sisal Rope ..... 30&2%
Covert's Saddlery Works:
Web and Leather Halters ..... 70%
Jute and Manila Rope Halters ..... 70%
Sisal Rope Halters ..... 60&20%
Jute, Manila and Cotton Rope Ties ..... 70%
Sisal Rope Ties ..... 60&20%

## Hammers—
### Handled Hammers—
Heller's Machinists' ..... 50&50&5%
Heller's Farriers ..... 50&50&5%
Magnetic Tack, Nos. 1, 2, 3, $1.25, $1.50, $1.75 ..... 40&10%
Peck, Stow & Wilcox ..... 50&10%
Fayette R. Plumb: Plumb, A. E. Nail ..... 33⅓&5@33⅓&10&5%
Engineers' and B. S. Hand ..... 50&10&7½@50&10&10&7½%
Machinists' Hammers ..... 50&10@30&10&10%
Riveting and Tinners' ..... 40&7½@40&10&7½%
Sargent's C. S. New List ..... 45%

### Heavy Hammers and Sledges—
*3 lb. and under* ..... *lb.* 45¢
*3 to 5 lb* ..... *lb.* 36¢ } 80@80&10%
*Over 5 lb* ..... *lb.* 30¢ }
*Wilkinson's Smiths'* ..... 9½¢@10¢ lb.

## Handcuffs and Leg Irons
See *Police Goods.*

## Handles—
### Agricultural Tool Handles—
*Axe, Pick, &c* ..... 60@60&10%
*Hoe Rake, Fork, &c* ..... 60@60&10%
*Shovel, &c., Wood D Handle* ..... 50@50&5%
### Cross-Cut Saw Handles—
Atkins' ..... 40&5%
Champion ..... 45@45&10%
Disston's ..... 50%
### Mechanics' Tool Handles—
*Auger, assorted* ..... *gro.* $2.30@$2.50
*Brad Awl* ..... *gro.* $1.25@$1.50
*Chisel Handles:*
*Apple Tanged Firmer, gro. ass'd.* $2.25@$2.35; *large,* $2.50@$2.60.
*Hickory Tanged Firmer, gro. ass'd* $1.75@$2.20; *large,* $3.50@$3.70.
*Apple Socket Firmer, gro ass'd,* $1.70@$1.85; *large,* $2.00@$2.25
*Hickory Socket Firmer, gro ass'd.* $1.60@$1.75; *large,* $1.75@$2.00
*Hickory Socket Framing, gro. ass'd.* $2.50@$2.75; *large,* $2.65@$2.85
*File, assorted* ..... *gro.* $1.00@$1.15
*Hammer, Hatchet, Axe, &c* ..... 60%
*Hand Saw, Varnished, doz.* 70@75¢
*Not Varnished* ..... 55@60¢
*Plane Handles:*
*Jack, doz.* 25¢; *Jack Bolted* ..... 55@60¢
*Fore, doz.* 35@38¢; *Fore, Bolted* ..... 70@75¢
Nicholson Simplicity File Handle, gro. ..... $0.85@$1.50
### Hangers—
*Barn Door, New Pattern, Round Groove, Regular:*

| *Inch* | 3 | 4 | 5 | 6 | 8 |
|---|---|---|---|---|---|
| *Doz* | $0.85 | 1.20 | 1.50 | 1.90 | 2.30 |

*Barn Door, New England Pattern, Check Back, Regular:*

| *Inch* | 3 | 4 | 5 | 6 |
|---|---|---|---|---|
| *Doz* | $1.20 | 1.75 | 2.50 | 3.00 |

Chicago Spring Butt Co.:
Friction ..... 25%
Oscillating ..... 25%
Big Twin ..... 25%
Chisholm & Moore Mfg. Co.:
Baggage Car Door ..... 50%
Elevator ..... 40%
Railroad ..... 55%
Columbian Hdw. Co.:
American Trackless ..... 33⅓&10%
Cronk Hanger Co.:
Loose Axle ..... 60%
Roller Bearing ..... 60&10%
Lane Bros.:
Parlor, Ball Bearing ..... $4.00
Parlor, Standard ..... $3.25
Parlor, New Model ..... $2.75
Parlor New Champion ..... $2.25
Barn Door, Standard ..... 60&10%
Covered ..... 50&10&10&5%
Special ..... 60&10%
Lawrence Bros.:
Advance ..... 60%
Cleveland ..... 70%
Crown ..... 60%
New York ..... 60%
Peerless ..... 60&10%
Sterling ..... 60%
McKinney Mfg. Co.:
No. 1, Special, $15 ..... 60&10%
No. 2, Standard, $18 ..... 60&10%
Stowell Mfg. and Foundry Co.:
Acme Parlor Ball Bearing ..... 40%
Atlas ..... 60%
Badger Barn Door ..... 50%
Baggage Car Door ..... 50%
Climax Anti-Friction ..... 50%
Elevator ..... 40%
Express ..... 50%
Interstate ..... 60%
Lundy Parlor Door ..... 50%
Magic ..... 50%
Matchless ..... 60%
Nansen ..... 60&10%
Railroad ..... 50%
Street Car Door ..... 50%
Steel, Nos. 400, 404, 500 ..... 40&15%
Stowell Parlor Door ..... 50%
Wild West, Nos. 300, 400, 500 ..... 5%
Zenith for Wood Track ..... 50%
Taylor & Boggis Foundry Co.:
Kidder's ..... 50&15&10&5%
Wilcox Mfg. Co.:
Bike Roller Bearing ..... 60&10%
C. J. Roller Bearing ..... 60&10%
Cycle Ball Bearing ..... 50%
Dwarf Ball Bearing ..... 40%
Ives, Wood Track ..... 60&10%
L. T. Roller Bearing ..... 60&10&5%
New Era Roller Bearing ..... 50&10%
O. K. Roller Bearing ..... 60&10&5%
Prindle, Wood Track ..... 60%
Richards' Wood Track ..... 60%
Richards' Steel Track ..... 50&10%
Spencer Roller Bearing ..... 60&10%
Tandem Nos. 1 and 2 ..... 60%
Underwriters' Roller Bearing ..... 40%
Velvet ..... 50%
Wilcox Auditorium Ball Bearing ..... 50%
Wilcox Barn Trolley No. 124 ..... 40%
Wilcox Elevator Door Hangers, Nos. 122 and 123½ ..... 50%
Wilcox Elevator Door Hangers No. 132 ..... 40%
Wilcox Fire Trolley, Roller Bearing ..... 30%
Wilcox Le Roy Noiseless Ball Bearing ..... 40%
Wilcox New Century ..... 50&10&10%
Wilcox O. K. Steel Track ..... 50%
Wilcox O. K. Trolley ..... 50%
Wilcox Trolley Ball Bearing ..... 40%
Wilcox Wideman Narrow Gauge Ball Bearing ..... 40%

## Harness Menders—See *Menders.*

## Harness Snaps—See *Snaps.*

## Hasps—
McKinney's Perfect Hasp ₱ doz. ..... 50%
Wrought Hasps, Staples, &c.—See *Wrought Goods.*

## Hatchets—
*Best Brands* ..... 60@50&10%
*Cheaper Brands* ..... 60@60&10%
*Note.—Net prices often made.*

## Hay and Straw Knives—See *Knives.*

## Hinges—
### Blind and Shutter Hinges—
*Surface Gravity Locking Blind: (Victor; National; 1838 O. P.; Niagara; Clark's O. P.; Clark's Tip; Buffalo.)*

| *No* | 1 | 3 | 5 |
|---|---|---|---|
| *Doz. pair* | $0.75 | 1.45 | 2.90 |

*Mortise Shutter: (L. & P., O. S., Dixie, &c.)*

| *No* | 1 | 1¼ | 2 | 2½ |
|---|---|---|---|---|
| *Doz. pair* | $0.60 | .55 | .52 | .45 |

*Mortise Reversible Shutter, (Buffalo, &c.)*

| *No* | 1 | 1½ | 2 |
|---|---|---|---|
| *Doz. pair* | $0.65 | .60 | .55 |

North's Automatic Blind Fixtures, No. 2, for Wood, $9.00; No. 3, for Brick, $11.50 ..... 10%
Parker ..... 70@75%
Reading's Gravity ..... 75&10%
Sargent's, Nos. 1, 3, 5, 11 & 13 ..... 70&10@70&20%
Stanley's Steel Gravity Blind Hinges, ₱ doz. sets, without screws, $0.80; with screws, $1.15.
Wrightsville H'dware Co.:
O. S., Lull & Porter ..... 80&2½%
Acme, Lull & Porter ..... 75&10%
Queen City Reversible ..... 75&10%
Stenger's Positive Locking, Nos. 1 & 3 ..... 70&10&5%
Shepard's Noiseless, Nos. 60, 65, 55 ..... 70&10%
Niagara, Gravity Locking, Nos. 1, 3 & 5 ..... 75&7½%
1838, Old Pat'n, Nos. 1, 3 & 5 ..... 75&7½%
Tip Pat'n, Nos. 1, 3 & 5 ..... 75&7½%
Buffalo Gravity Locking, Nos. 1, 3 & 5 ..... 75&7½%
Shepard's Double Locking, Nos. 20 & 25 ..... 70&10%
Champion Gravity Locking, No. 75 ..... 75&7½%
Steamboat Gravity Locking, No. 10 ..... 75&7½%
Pioneer, Nos. 060, 45 & 5½ ..... 75&7½%
Empire, Nos. 101 & 103 ..... 70&7½%
W. H. Co.'s Mortise Gravity Locking, No. 2 ..... 60&10%

### Gate Hinges—
*Clark's or Shepard's—Doz. sets:*

| *No* | 1 | 2 | 3 |
|---|---|---|---|
| *Hinges with Latches* | $1.80 | 1.90 | 2.65 |
| *Hinges only* | $1.20 | 1.50 | 2.00 |
| *Latches only* | .60 | .60 | .65 |

*New England:*
*With Latch* ..... *doz* ..... @$1.55
*Without Latch* ..... *doz.* ..... @$1.25
*Reversible Self-Closing:*
*With Latch* ..... *doz.* ..... @$1.80
*Without Latch* ..... *doz.* ..... @$1.45
*Western:*
*With Latch* ..... *doz.* $1.40@1.75
*Without Latch* ..... *doz.* $0.95@1.20
Wrightsville H'dware Co.: Shepard's or Clark's, doz. sets,

| No. | 1 | 2 | 3 |
|---|---|---|---|
| Hinges with Latches | $1.80 | 2.00 | 2.75 |
| Hinges only | 1.20 | 1.50 | 2.10 |
| Latches only | .65 | .65 | .70 |

### Spring Hinges—
*Holdback, Cast Iron, gro.* $8.00@9.00
*Non-Holdback, Cast Iron* ..... *gro* $7.00@7.50
J. Bardsley Bardsley's Patent Checking ..... 15%
Bommer Bros.: Bommer Ball Bearing Floor Hinges ..... 40%
Bommer Spring Hinges ..... 40%
Chicago Spring Butt Co.:
Chicago ..... 25%
Floor Hinge ..... 50%
Garden City Engine House ..... 25%
Keene's Saloon Door ..... 25%
Triple End ..... 50%
Columbian Hdw. Co.:
Acme, Wrt. Steel ..... 30%
Acme, Brass ..... 20%
American ..... 30%
Columbia, No. 14 ..... ₱ gr. $9.00
Columbia, No. 18 ..... ₱ gr. $25.00
Columbia, Adjustable ..... 30%
Gem new list ..... 25%
Clover Leaf ..... ₱ gr. $12.50
Oxford new list ..... 25%
Hoffman Hinge & Foundry Co.: No. 70 & 80 Holdback Detachable $8.50
Lawson Mfg. Co.:
Matchless ..... 35%
Matchless Pivot ..... 45%
Payson Mfg. Co.:
Oblique ..... 50&10%
Stover Mfg. Co.:
Ideal, No. 16, Detachable, ₱ gr. ..... $12.50
Ideal, No. 4 ..... ₱ gr. $9.00
New Idea No. 1 ..... ₱ gr. $9.00
New Idea, Double Acting ..... 15%

Extra 5@10% often given.

Extra 10% often given on most of these Hinges.

### Wrought Iron Hinges—
*Strap and T Hinges, &c., list Mar. 15, 1901:*
*Light Strap Hinges* ..... 70%
*Heavy Strap Hinges* ..... 75&10%
*Light T Hinges* ..... 60&5%
*Heavy T Hinges* ..... 60&5%
*Extra Heavy T Hinges* ..... 75%
*Hinge Hasps* ..... 55%
*Cor. Heavy Strap* ..... 75&10%
*Cor. Ex. Heavy T* ..... 75%
*Screw Hook and Strap: 6 to 12 in* ..... *lb* 3½c; *14 to 20 in* ..... *lb.* 3 c; *22 to 36 in* ..... *lb.* 2½c } Extra 2 @ 20%
*Screw Hook and Eye:*
*¾ to 1 inch* ..... *lb* 5 c
*⅝-inch* ..... *lb.* 6 c
*½-inch* ..... *lb.* 7 c

### Miscellaneous—
Hoffman's Steel Spring Butt Hinges ..... 40&10%
Hoffman's Offset Refrigerator Hinges ..... 40&10%

## Hods, Coal—

| | 15 | 16 | 17 | 18 inch. |
|---|---|---|---|---|
| *Galv. Open* | $2.70 | 3.00 | 3.30 | 3.60 ₱ doz. |
| *Jap. Open* | $2.10 | 2.40 | 2.70 | 3.00 ₱ doz. |
| *Galv. Funnel* | $3.30 | 3.60 | 3.90 | 4.20 ₱ doz. |
| *Jap. Funnel* | $2.70 | 3.00 | 3.30 | 3.60 ₱ doz. |

## Hoes— Eye—
*Scovil and Oval Pattern* ..... 60&5%@60&10&5%
*Grub, list Feb. 23, 1899* ..... 70@70&10%
D. & H. Scovil ..... 35%

### Handled—
*Sept. 1, 1900, List:*
*Field and Garden* ..... 75&2%
*Ladies', Boys', Toy and Onion* ..... 70&10&10%
*Street and Mortar* ..... 75&7½&2%
*Cotton* ..... 70&10&10&5&2%
*Planters'* ..... 70&30%
*Weeding* ..... 75%
*Note.—Manufacturers and jobbers use a diversity of lists, and often sell at net prices.*
Ft. Madison Crucible Garden Hoe ..... 75&2%
Ft. Madison Crescent Cultivator Hoe, per doz ..... 75&10&2%
Ft. Madison Mattock Hoes: Regular Weight ..... ₱ doz. $4.50
Junior Size ..... ₱ doz. $4.00
Ft. Madison Sprouting Hoe, ₱ doz. $4.80
Ft. Madison Dixie Tobacco Hoe ..... 75&20%
Kretsinger's Cut Easy, per doz ..... 75&2%
Warren Hoe ..... 60%
W. & C. Ivanhoe ..... 75&2%
B. B. Cultivator Hoe ..... 75&10&2%
Acme Weeding ..... 75&10&2%
W. & C. Lightning Shuffle Hoe, ₱ doz. ..... $4.85

## Hog Rings and Ringers—See *Rings and Ringers.*

## Hoisting Apparatus—See *Machines, Hoisting.*

## Hollow Ware—See *Ware, Hollow.*

## Holders— Bolt—
Angular, ₱ doz. $24.00 ..... 45&10%
### Door—
Empire ..... 30%
### File and Tool—
C. E. Jennings & Co.'s Model Tool Holders ..... 33⅓%
Nicholson File Holders and File Handles ..... 33⅓%

## Hooks— Cast Iron—
Bird Cage, Reading ..... 60%
Bird Cage, Sargent's List ..... 50&10@60%
Ceiling, Sargent's List ..... 40&10%
Clothes Line, Hoffman's ..... 40&10%
Clothes Line, Reading List ..... 65&10@65&10&10%
Clothes Line, Sargent's List ..... 50&10&10%
Coat and Hat, Sargent's List ..... 45&10%
Clothes Line, Stowell's ..... 70%
Coat and Hat, Stowell's ..... 70%
Coat and Hat, Reading ..... 70@75%
Coat and Hat, Wrightsville ..... 65&10%
Harness, Reading List ..... 70&10@75%

### Wire—
*Belt* ..... 80%
*Wire C. & H. Hooks* ..... 60&10@60&10&5%
Atlas, Coat and Hat: Single Cases ..... 45%
10 Case Lots ..... 45&10%
Czar Harness ..... 50&10&5%
Wire Coat and Hat: Acme ..... 60%
B. B. ..... 60%
V Brace, Chief and Czar ..... 60%
Gem ..... 60%
Bright Wire Goods—See *Wire.*

### Wrought Iron—
*Box, 6 in., per doz. $1.50; 8 in., $1.75; 10 in., $2.00.*
*Cotton* ..... *doz.* $1.05@1.25
Wrought Staples, Hooks, &c.—See *Wrought Goods.*

### Miscellaneous—
*Bush, Light, doz. $5.50; Medium, $6.00; Heavy, $6.50*
*Grass* ..... *Nos.* 1 2 3 4
*Best* ..... $1.50 1.75 2.00
*Common* ..... $1.30 1.40 1.60
*Potato and Manure* ..... 70%
*Whiffletree* ..... *lb.* 4½c
*Hooks and Eyes:*
*Brass* ..... 60&10&10@70%
*Malleable Iron* ..... 70&5@70&10%
Covert Saddlery Works' Self Locking Gate and Door Hook ..... 60%
Crown Picture ..... 50&10%
Bench Hooks—See *Bench Stops.*
Corn Hooks—See *Knives, Corn.*

## Horse Nails—See *Nails, Horse*
## Horseshoes—See *Shoes, Horse.*

## Hose, Rubber—
*Garden Hose, ¾-inch:*
*Competition* ..... *ft.* 4½@ 4¾c
*3-ply Standard* ..... *ft.* 5 @ 6 c
*4-ply Standard* ..... *ft.* 8 @ 9 c
*3-ply extra* ..... *ft.* 9 @10 c
*4-ply extra* ..... *ft.* 11 @12 c
*Cotton Garden, ¾-in., coupled:*
*Low Grade* ..... *ft.* 6 @7 c
*Fair quality* ..... *ft.* 8 @9 c

## Irons— Sad—
*From 4 to 10* ..... *lb* 3@3½c
*B. B. Sad Irons* ..... *lb.* 5½@6c
*Chinese Laundry* ..... *lb.* 5@5½c
*Chinese Sad* ..... *lb.* 3½@3¾c
*Mrs. Potts', per set:*

| *Nos.* | 50 | 55 | 60 | 65 |
|---|---|---|---|---|
| | 65@70c | 60@65c | 75@80c | 70@75c |

*New England Pressing, lb.* ..... 3½@3¾c

### Soldering—
*Soldering Coppers, 1 & 1¼ lb., 21@22*
*2 lb., and up* ..... 19@20c
Covert Mfg. Co ..... 20&2½
Smith & Hemenway Co's Sets ..... 70%

### Pinking—
*Pinking Irons* ..... *doz.* 50@60c

## Jack Screws—See *Screws.*

### Jacks, Wagon—
Covert Mfg. Co., Steel ..... 45&2½
Covert's Saddlery Works': Daisy ..... 60&10%
Victor ..... 60&10%
Lockport ..... 40@40&10%
Lane's Steel ..... 33⅓&5%

## Kettles—
*Brass, Spun, Plain* ..... 20@25%
Enameled and Cast Iron—See *Ware, Hollow.*

### Knife Sharpeners—See *Sharpeners, Knife.*

### Knives—
#### Butcher, Shoe, &c.—
Foster Bros.' Butcher, &c ..... 30%
Hartzell Cutlery Co ..... 50&5%
Smith & Hemenway Co ..... 40&10%
Hay and Straw—See *Hay Knives.*
#### Corn—
Ft. Madison Cut-Easy, ₱ doz. ..... $3.25
Withington Acme, ₱ doz., $2.65; Dent, $2.75; Adj. Serrated, $2.20; Serrated, $2.10; Yankee No. 1, $1.50; Yankee No. 2, $1.15.
#### Drawing—
*Standard List* ..... 70&5@70&10%
Adjustable Handle ..... 25%
Bradley's ..... 35%
Cantelo's Folding ..... 50&50&5%
C. E. Jennings & Co. Nos. 45, 46 ..... 40&10%
Jennings & Griffin ..... 60&5%
Swan's ..... 70&10&2½%
Watrous ..... 25%
L. & L. J. White ..... 20&5@25%

### Hay and Straw—
*Lightning Pat'n ..... per doz*
Iwan's Sickle Edge ..... ₱ doz. $10.00
Iwan's Serrated ..... ₱ doz., $11.00
Lightning, (Genuine) ..... $5.25@6.50
Maine ..... ₱ doz. $8.50

### Mincing—
Buffalo ..... ₱ gro. $15.00

### Miscellaneous—
*Farriers'* ..... *doz. $2.00@3.00*
Wos enholm's ..... ₱ doz. $3.00@3.25

### Knobs—
*Base, 2¼-inch, Birch, or Maple, Rubber tip, gro* ..... $1.20@1.25
*Carriage, Jap, all sizes* ..... *gro.* 70@80c
*Door, Mineral* ..... *doz.* 60@65c
*Door, Por. Jap d* ..... *doz.* 65@70c
*Door, Por. Nickel* ..... *doz.* $2.00@2.10
Bardsley's Wood Door, Shutter, &c ..... 15%
Picture, Sargent's ..... 60&10%

## Lacing Leather—See *Belting, Leather—*

## Ladders, Step, Etc.—
Goshen Mfg. Co ..... 50%

**Ladies' Melting**
L. & C. Mfg. Co. ..... 25%
P. S. & W. ..... 50%
Reading ..... 60%
Sargent's ..... 40@40&10%

**Lanterns' Tubular**
*Regular Tubular* ..... doz. $4.35@4.75
*Side Lift Tubular* ..... doz. $4.75@5.25
*Square Lift Tubular* ..... doz. $4.75@5.25
*Other Styles* ..... 50@10@40@10@5%

**Bull's Eye Police**
*No. 1, 2¾ inch* ..... $3.60
*No. 2, 3 inch* ..... $4.00

**Latches, Thumb**
*Roggin's Latches* ..... doz. 30@33c

**Lawn Mowers**
See *Mowers, Lawn.*

**Leaders' Cattle**
*Small* ..... doz. 50c; *large*, 85c
Covert Mfg. Co. ..... 45&2%

**Lemon Squeezers**
See *Squeezers, Lemon.*

**Lifters, Transom**
Solid Grip, Payson Mfg. Co. ..... 80%
R. & E. ..... 45%

**Lines**

| *Wire Clothes, Nos...* | 18 | 19 | 20 |
|---|---|---|---|
| *100 feet* | $1.20 | 1.00 | 1.65 |
| *75 feet* | $1.80 | 1.70 | 1.50 |

Cassawan Mills.
Crown Solid Braided Chalk ..... 33⅓%
Mason's, No. 0 to No. 3 ..... 33⅓%
Samson Cordage Works:
Solid Braided Chalk, No. 0 to 3 ..... 40%
Silver Lake Braided Chalk, No. 0, $6.00; No. 1, $6.50; No. 2, $7.00; No. 3, $7.50
¶ gr. ..... 80%

**Locks' Cabinet**
*Cabinet Locks* ..... 33⅓@33⅓&7½%

**Door Locks, Latches, &c.**
[Net prices are very often made on these goods.]
Reading Hardware Co. ..... 50%
R. & E. Mfg. Co. ..... 50%
Sargent & Co. ..... 40@40&10%

**Elevator**
Stowell's ..... 40%

**Padlocks**
*Wrought Iron* ..... 75@10@5@30@5%
R. & E. Mfg. Co. Wrt. Steel and Brass 50%

**Sash, &c.**
Fitch's:
Bronze and Brass ..... 66⅔%
Iron ..... 70%
Ives' Patent:
Bronze and Brass ..... 62½%
Iron ..... 65%
Wrought Bronze and Brass ..... 55&5%
Wrought Steel ..... 60%
Payson's Signal ..... 80%
Reading ..... 60@10@10@70%

**Machines' Boring**
*Common, Upright, Without Augers,* $3.00
*Common, Angular, Without Augers,* $2.25

| Without Augers. | Upright. | Angular. |
|---|---|---|
| R. & E. Mfg. Co.: | | |
| Improved No. 3 | $4.25 | No. 1 $5.00 |
| Improved No. 4 | 3.75 | No. 2 3.38 |
| Improved No. 5 | 2.75 | |
| Jennings' | 2.50 | 3.00 |
| Millers' Falls | | 5.75 |
| Snell's, Rice's Pat. | 2.50 | 2.75 |
| Swan's, No. 500 | 5.10 | No. 200 6.45 |

**Hoisting**
Moore's Anti-Friction Differential Pulley Block ..... 30%
Moore's Hand Hoist, with Lock Brake 30%
Moore's Portable Pneumatic Hoist ..... 25%

**Ice Cutting**
Chandler's ..... 15%

**Washing**
Wayne American ..... ¶ doz. $28.00
Western Star, No. 2 ..... ¶ doz. 28.00
Western Star, No. 3 ..... ¶ doz 30.00
St. Louis, No. 41 ..... ¶ doz. 60.00

**Mallets**
*Hickory* ..... 45&5@50%
*Lignumvitæ* ..... 45@5@50%
*Tinners', Hickory and Applewood, doz.* ..... 50@55c

**Mats' Door**
Elastic Steel (W. G. Co.) ..... 10%

**Mattocks**
See *Picks and Mattocks.*

**Meat Cutters**
See *Cutters, Meat.*

**Milk Cans** See *Cans, Milk*

**Mills' Coffee**
Enterprise Mfg. Co. ..... 25@30%
National, list Jan. 1, '94 ..... 30%
Parker's Columbia and Victor ..... 50&10@60%
Parker's Box and Side ..... 50&10@60%
Swift, Lane Bros. ..... 30%

**Mincing Knives**
See *Knives, Mincing.*

**Molasses Gates**
See *Gates, Molasses.*

**Money Drawers**
See *Drawers, Money.*

**Mowers, Lawn**
*Net prices are generally quoted.*
*Cheap* ..... *all sizes, $1.90@1.95*
*Good* ..... *all sizes, $2.25@2.50*

| | 10 | 12 | 14 | 16-inch |
|---|---|---|---|---|
| *High Grade* | 4.25 | 4.50 | 4.75 | 5.00 |

Continental ..... 60&10&5%
Great American ..... 70&5%
Great American Ball Bearing ..... 60&10&5%
Quaker City ..... 70&5%
Pennsylvania ..... 60&10&5%
Pennsylvania Golf ..... 50%
Pennsylvania Horse ..... 40%
Pennsylvania Pony ..... 45%
Philadelphia:
Styles M., S., C., K., T. ..... 70&5%
Style A, all Steel ..... 60&10%
Style E, Low Wheel ..... 60&10%
Style E, High Wheel ..... 70&10&5%
Drexel and Gold Coin, low list ..... 50&5%

**Nails**
*Cut and Wire. See Trade Report.*
*Wire Nails and Brads, Papered. List July 10, 1899* .85&10@85&10&10%

*Hungarian, Finishing, Upholsterers', &c. See Tacks.*

**Horse**

| Nos. | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|
| A. C. | 25¢ | 23¢ | 22¢ | 21¢ | 21¢ |
| Ausable | 28¢ | 28¢ | 25¢ | 24¢ | 23¢ |
| Capewell | 19¢ | 18¢ | 17¢ | 16¢ | 16¢ |
| C. B. K. | 25¢ | 25¢ | 22¢ | 21¢ | 21¢ |
| Champ'in | 28¢ | 26¢ | 25¢ | 24¢ | 23¢ |

40&10&5%

| | | | | | |
|---|---|---|---|---|---|
| Clinton | 19¢ | 17¢ | 16¢ | 15¢ | 14¢ |

30&10&5%

| | | | | | |
|---|---|---|---|---|---|
| Maud S. | 25¢ | 23¢ | 22¢ | 21¢ | 21¢ |
| Neponset | 23¢ | 21¢ | 20¢ | 19¢ | 18¢ |
| Putnam | 23¢ | 21¢ | 20¢ | 19¢ | 18¢ |
| Vulcan | 23¢ | 21¢ | 20¢ | 19¢ | 18¢ |

50%
40%
33⅓%
25&10%
American, Nos. 5 to 16 ¶ ℔ ..... 9@9½¢
*Jobbers' special brands...per lb.* 8@9c

**Picture**

| | 1¼ | 2 | 2½ | 3 | 3½ in. |
|---|---|---|---|---|---|
| *Brass Head* | .65 | .80 | .70 | .95 | 1.00 gro. |
| *Por. Head* | .. | 1.10 | 1.10 | 1.10 | .. gro. |

**Nippers,** See *Pliers and Nippers.*

**Nut Crackers**
See *Crackers, Nut.*

**Nuts**
*Cold Punched:* *Off list.*
*Mfrs. or U. S. Standard.*
*Square, plain* ..... $5.00@5.10
*Hexagon, plain* ..... $5.30@5.40
*Square, C. T. & R.* ..... $5.20@5.30
*Hexagon, C. T. & R.* ..... $5.80@5.90
*Hot Pressed:*
*Mfrs., U. S. or Nar. Gauge Stan'd.*
*Square Blank* ..... $5.20@5.30
*Hexagon Blank* ..... $5.80@5.90
*Square Tapped* ..... $5.00@5.10
*Hexagon Tapped* ..... $5.60@5.70

**Oakum**
*Best or Government* ..... *lb.* 6¼c
*Navy* ..... *lb.* 5 c
*U. S. Navy* ..... *lb.* 5¾c
*Plumbers' Spun Oakum* ..... 5¾c
*In carload lots ¼c lb. off f.o.b. New York.*

**Oil Axle**
Snow Flake:

| | |
|---|---|
| 1 pt. cans, per doz. | $3.00 |
| 1 qt. cans, per doz. | $4.80 |
| 1 gal. cans, per doz. | $15 00 |
| 5 gal. cans, per doz. | $66.00 |

35%&10%

**Oil Tanks** See *Tanks, Oil.*

**Oilers**
*Brass and Copper* ..... 40¢10@50%
*Tin or Steel* ..... 60¢10@65%
*Zinc* ..... 60¢10@65%
*Paragon:*
*Brass and Copper* ..... 40¢10%
*Tin or Steel* ..... 60¢10%
*Zinc* ..... 60¢10%
Malleable, Hammers' Improved, No. 1, $3.00; No. 2, $4; No. 3, $4.40 ¶ doz. 20%
Malleable, Hammers' Old Pattern, same list ..... 50&10%
Wilmot & Hobbs Mfg. Co:
Spring Bottom Cans ..... 70@70&10%
Railroad Oilers etc. ..... 60@60&10%

**Openers' Can**
*French* ..... doz. 25c
*Iron Handle* ..... doz. 25@27c
*Sprague, Iron Hdle...per doz.* 35@40c
*Sardine Scissors...doz.* $1.75@$3.00
Tip Top ..... per doz. $0.75
National, ¶ gro. ..... $1.75@$2.00
Stowell's ..... per doz. 35@45¢
Waldorf, ¶ gro. ..... $3.85

**Egg**
Nickel Plate ..... per doz., $2.25
Silver Plate ..... per doz., $3.50

**Packing**
*Asbestos Packing, Wick and Rope,* 15@15½c lb.

**Rubber**
*Sheet, C. I.* ..... 8@12c
*Sheet, C. O. S.* ..... 9@15c
*Sheet, C. B. S.* ..... 10@14c
*Sheet, Pure Gum* ..... 60@70c
*Sheet, Red* ..... 35@40c
Jenkins' Standard, ¶ ℔ 80¢ ..... 25@25&5%

**Miscellaneous**
*American Packing* ..... 7@10c lb.
*Cotton Packing* ..... 15@14c lb.
*Italian Packing* ..... 9@12½c lb.
*Jute* ..... 5½@4c lb.
*Russia Packing* ..... 7@11c lb.

**Pails' Creamery**
S. S. & Co., with gauges. No 1 $5.50; No. 2, $5.75 ¶ doz.

**Galvanized**
Price per gro.

| | *Quart* | 10 | 12 | 14 |
|---|---|---|---|---|
| *Water, Regular* | | 18.00 | 21.00 | 24.00 |
| *Water, Heavy* | | 24.00 | 27.20 | 30.00 |
| *Fire, Rd. Bottom* | | 31.00 | 33.00 | 35.00 |
| *Well* | | 27.00 | 29.00 | 31.00 |

**Pans' Dripping**
*Standard List* ..... 50¢10@50¢10%

**Fry**
*Common Lipped:*

| *No.* | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|
| *Per doz.* | $0.60 | .75 | .85 | .95 | 1.15 |

**Roasting and Baking**
Regal, S. S. & Co., ¶ doz., Nos. 5, $4.50; 10 $5.00; 20, $5.50; 30, $6.00
Simplex, ¶ gro., No. 40 $30.00; 50, $34.50; 60 $39 00; 140, $33.00; 150, $37.50; 160, $43.00.

**Paper—Building Paper**

| *Asbestos:* | *lb.* |
|---|---|
| *Building Felt* | 3c |
| *Mill Board, sheet, 40 x 40 inches* | 4c |
| *Mill Board, roll, thicker than 1-16 inch* | 3c |
| *Mill Board, roll, 1-16 in. thick and less* | 3c |

| | *Per roll 500 sq. ft.* |
|---|---|
| *Rosin Sized Sheathing:* | |
| *Light wt., 20 lbs. to roll* | $0.38 |
| *Medium wt., 30 lbs. to roll* | $0.47 |
| *Heavy wt., 40 lbs. to roll* | $0.58 |
| *Medium Grades Water Proof Sheathing* | $0.65@1.25 |
| *Deafening Felt, 2, 3 and 4½ sq. ft. to lb., ton* | $40.00@42.00 |

*Red Rope Roofing, $50 sq. feet per roll* ..... $1.65

**Tarred Paper**
*1 ply (roll 500 sq.ft.), ton* ..$38.00@50.00
*2 ply, roll 108 sq. ft* ..... 40@45c
*3 ply, roll 108 sq. ft* ..... 60@65c
*Slater's Felt (roll 500 sq. ft.)*..50@60c
R. R. M. Stone Surfaced roofing (roll 110 sq. ft.) ..... $2.75

**Sand and Emery**
*List Dec. 23, 1899* ..50¢10@50¢10¢10%

**Parers' Apple**

| | |
|---|---|
| Advance ..... ¶ doz. | $4.50 |
| Baldwin ..... ¶ doz. | $5.00 |
| Bonanza ..... each | $5.00 |
| Dandy ..... each | $7.50 |
| Eureka, 1898 ..... each | $16.00 |
| Family Bay State ..... ¶ doz. | $12.00 |
| Hudson's Little Star ..... ¶ doz. | $4.00 |
| Hudson's Rocking Table ..... ¶ doz. | $5.50 |
| Improved Bay State ¶ doz. | $27.00@30.00 |
| New Lightning ..... ¶ doz. | $5.50 |
| Reading '72 ..... ¶ doz. | $4.00 |
| Reading '78 ..... ¶ doz. | $7.00 |
| Turn Table '98 ..... ¶ doz. | $5.50 |
| White Mountain ..... ¶ doz. | $4.00 |

**Potato**

| | |
|---|---|
| Saratoga ..... | ¶ doz. $5.50 |
| White Mountain ..... | ¶ doz. $4.50 |

**Picks and Mattocks**
*List Feb. 23, 1899* ..... 70@70¢10%

**Pigeons' Clay**
Markle's Black Birds, f.o.b. factory, per M. ..... $3.75
See also *Traps, Target.*

**Pinking Irons**
See *Irons, Pinking.*

**Pins' Escutcheon**
*Brass* ..... 60%
*Iron, list Nov. 11, '85* ..... 60%

**Pipe, Cast Iron Soil**
*Standard, 2-6 in* ..... 60¢7½%
*Extra Heavy, 2-6 in* ..... 70%
*Fittings* ..... 75¢5%
NOTE.—*Carload lots to jobbers 10% less, and freight allowed.*

**Pipe, Merchant, Boiler Tubes, &c.**
*Less than Carloads to Consumers.*

| *Merchant Pipe.* | *Black.* | *Galvanized.* |
|---|---|---|
| ⅛ to ½ inch | 61% | 48% |
| ¾ to 10 inch | 68½% | 56% |
| *Boiler Tubes* | *Up to* | *22 feet.* |
| *Steel.* | | |
| *1 to 1¼ inch and 2¾ to 5 inch inclusive* | | 65½% |
| *2 to 2½ inch, inclusive* | | 60% |
| *6 to 10 inches* | | 59% |
| *Iron.* | | |
| *1 to 1½ inch and 2½ in.* | | 45½% |
| *1¾ to 2 inch* | | 53% |
| *2¼ to 15 inch* | | 53% |
| *Casing, Cut Lengths.* | | *S. & S.* |
| *2 to 3 inch* | | 53½% |
| *3½ to 4 inch* | | 50% |
| *4½ to 12½ inch* | | 61½% |

NOTE.—*Prices are largely nominal owing to scarcity of Pipe. Jobbers are obtaining almost any price they ask.*

**Pipe, Sewer**
*Standard Pipe and Fittings, 2 to 24 in.*
*New England* ..... 70%
*New York and New Jersey* ..... 75%
*Ohio and Michigan* ..... 80%
*Carload lots are generally delivered.*

**Planes and Plane Irons' Wood Planes**
*Molding* ..... 40¢2½@40¢10%
*Bench, First quality* ..... 45¢10@45¢10¢5%
*Bench, Second quality* ..... 50¢10@50¢10¢5%
Bailey's (Stanley R. & L. Co) ..... 50&10@50&10&10%
Gage Self Setting ..... 35%

**Iron Planes**
Bailey's (Stanley R. & L. Co) ..... 50&10@50&10&10%
Chaplin's Iron Planes ..... 50&10%
Miscellaneous Planes (Stanley R. & L. Co.) ..... 25&10@25&10&10%
Sargent's ..... 50&10&10%

**Plane Irons**
*Wood Bench Plane Irons* ..... 50¢5@50¢10¢5%
Buck Bros. ..... 30%
Stanley R. & L. Co ..... 50&10@50&10&10%
L. & J. J. White ..... 20@5@25%

**Planters, Corn, Hand**
Kohler's Eclipse ..... ¶ doz. $9.00

**Plates**
*Felloe* ..... *lb.* 3½@4c
Self-Sealing Pie Plates (S. S. & Co.), ¶ doz. $2.00 ..... 50%

**Pliers and Nippers**
*Button Pliers* ..... 70¢10@75%
*Gas Burner, per doz., 5 in., $1.15@ $1.20; 6 in., $1.35@$1.45*
*Gas Pipe* ..... 7 8 10 12-in.
*$1.75 $2.00 $2.75 $5.75*
Acme Nippers ..... 60@50&5%
Bernard's:
Parallel Pliers, &c. ..... 35%
Paragon Pliers ..... 50&5%
Lodi Pliers ..... 50&5%
Elm City Fence Pliers ..... 35%
Cronk Hanger Co.:
American Button ..... 75&10%
Cronk's ..... 60%
Improved Button ..... 70&10%
Stub's Pattern ..... 50%
Combination and others ..... 25%
Heller's Farriers' Nippers, Pincers, and Tools 50@50&5%
P., S. & W. Tinners' Cutting Nippers ..... 30@30&10%
Swedish Side, End and Diagonal Cutting Pliers ..... 50%
Utica Drop Forge & Tool Co.:
Pliers and Nippers, all kinds ..... 40%

**Plumbs and Levels**
*Plumbs and Levels* ..... 75@75&10%
Davis Iron, Machinist Nos. 1 to 14 ..... 20%
Davis Iron, Adjustable Nos. 6 to 40 ..... 35%
Disston's ..... 70%
Pocket Levels ..... 70&10&10@75&10%
Stanley R. & L. Co ..... 70&10@70&10&10%
Stanley's Duplex ..... 25&10@25&10&10%
Woods' Extension ..... 33⅓%

**Poachers, Egg**
Buffalo Steam Egg Poachers, ¶ doz., No. 1, $7.20; No. 2, $11.00 No. 3, $11.00; No. 4, $14.50 ..... 50%

**Points, Glaziers'**
*Bulk and 1 lb. papers* ..... *lb.* 8 c@..
*½-lb. papers* ..... *lb.* 8½c@..
*¼-lb. papers* ..... *lb.* 9 c@..

**Pokes, Animal**
Ft. Madison Hawkeye ..... ¶ doz. $3.25
Ft. Madison, Western ..... ¶ doz. $3.75

**Police Goods**
*Manufacturers' Lists* ..... 25@25&5%
Tower's ..... 25%

**Polish—Metal**
Prestoline Liquid, No. 1 (1¼ pt.), ¶ doz. $3.00; No. 2 (1 qt.), $9.72 ..... 40%
Prestoline Paste ..... 40&10%
George William Hoffman:
U. S. Metal Polish Paste, 3 oz. boxes, ¶ doz. 50¢; ¶ gr. $4.50; ½ ℔ boxes, ¶ doz. $1.25; 1 ℔ boxes, ¶ doz. $2.25.
U. S. Liquid, 8 oz. cans, ¶ doz. $1.25; ¶ gr. $12.00.
Barkeepers' Friend Metal Polish, ¶ doz. $1.75; ¶ gr. $18.00.
Wynn's White Silk, ¼ pt. cans, ¶ doz. ..... $2.00

**Stove**
Black Eagle Benzine Paste, 5 ℔ cans ..., ¶ ℔ 10¢
Black Eagle, Liquid, ¼ pt. cans. ..... ¶ doz. 75¢
Black Jack Paste, ¼ ℔ cans, ¶ gro. $9.00
Ladd's Black Beauty, gr. $10.00 ..... 50%
Joseph Dixon's, ¶ gr. $5.75 ..... 10%
Dixon's Plumbago ..... ¶ ℔ 8¢
Fireside ..... ¶ gr. $3.50
Gem, ¶ gr. $4.50 ..... 10%
Japanese ..... ¶ gr. $3.50
Jet Black ..... ¶ gr. $3.50
Peerless Iron Enamel, ¼ pt. cans. ..... ¶ doz. $1.50
Wynn's:
Black Silk, 5 ℔ pail ..... each 70¢
Black Silk, ½ ℔ box ..... ¶ doz. $1.00
Black Silk, 5 oz. box ..... ¶ doz. $0.75
Black Silk, ½ pt. liq ..... ¶ doz. $1.00

**Poppers, Corn**
*Round or Square:*
*1 qt* ..... gro. $7.00@$7.50
*1½ qt* ..... gro. 9 50@ 10.00
*2 qt* ..... gro. 10.50@ 11.00

**Post Hole and Tree Augers and Diggers**
See also *Diggers, Post Hole, &c.*

**Potato Parers**
See *Parers, Potato.*

**Pots' Glue**
*Enameled* ..... 48%
*Tinned* ..... 40%

**Powder**
*In Canisters:*
*Duck, ½ lb. each* ..... 45c
*Fine Sporting, 1 lb. each* ..... 75c
*Rifle, ½-lb. each* ..... 15c
*Rifle, 1-lb. each* ..... 25c
*In Kegs:*
*Duck, 6½-lb. kegs* ..... $2.25
*Duck, 12½-lb. kegs* ..... $4.25
*Duck, 25-lb kegs* ..... $8.00
*Rifle, 6½-lb kegs* ..... $1.25
*Rifle, 12½-lb. kegs* ..... $2.25
*Rifle, 25-lb. kegs* ..... $4.00
King's Semi-Smokeless:
Keg (25 ℔ bulk) ..... $6.50
Half Keg (12½ ℔ bulk) ..... $3.50
Quarter Keg (6¼ ℔ bulk) ..... $1.90
Case 24 (1 ℔ cans bulk) ..... $8.50
Half case (1 ℔ cans bulk) ..... $4 50

| King's Smokeless: | Shot Gun | Rifle |
|---|---|---|
| Keg (25 ℔ bulk) | $12 00 | $15.00 |
| Half Keg (12½ ℔ bulk) | 6.25 | 7.75 |
| Quarter Keg (6¼ ℔ bulk) | 3.25 | 4.00 |
| Case 24 (1 ℔ cans bulk) | 14.00 | 17 00 |
| Half case 12 (1 ℔ cans blk) | 7.25 | 8 75 |

**Presses' Fruit and Jelly**
Enterprise Mfg. Co. ..... 30@25%

**Pruning Hooks and Shears** See *Shears.*

**Pullers, Nail**
Cyclops ..... 40@40&10%
Smith & Hemenway Co.:
Diamond B, No. 2, case lots, ¶ doz $6.00
Diamond B, No. 3, case lots, ¶ doz $5.50
Giant, No. 1, ¶ doz. $18; No. 2, $16.50; No. 3, $15. ..... 40%
Miller's Falls, No. 3, per doz. $12.00 ..... 15&10%
Pelican ¶ doz. $9.00 ..... 40&10%
Scranton, Case Lots:
No. 1 (large), ¶ doz. $4.50; No. 2 (large), $3.75; No 3 (small), $3.00; No. 2-B (large), $3.50; No. 3-B (small), $3.00; No. 2-D (large), $4 50; No 3-D (small) $4 00.

**Pulleys' Single Wheel**

| *Inch* | 2 | 2½ | 3 |
|---|---|---|---|
| *Awning ..doz.* | $0.45 | .70 | .95 |
| *Inch* | 2 | 2½ | 2½ |
| *Hay Fork, Swivel or Solid Eye* | | doz. | $1.35@1.50 |
| *Hot House..doz* | | $0.65 | .90 1.20 |
| *Inch* | 1¼ | 1¾ | 1¾ 2 |
| *Screw* | *doz.* | $0.15 | .20 .25 .30 |
| *Inch* | 1¾ | 2 | 2½ 2½ |
| *Side* | *doz.* | $0.30 | .40 .55 .60 |
| *Inch* | 1¼ | 1¾ | 2 2½ |
| *Tackle* | *doz.* | $0.30 | .45 .65 1.10 |

Stowell's:
Ceiling or End, Anti-Friction ..... 60%
Dumb Waiter, Anti-Friction. .60&10%
Hay Fork, Anti-Fricton, 5-in. Wheel, ¶ doz. $12.00 ..... 50%
Electric Light ..... 60%
Side, Anti-Friction ..... 60&10%

**Sash Pulleys**
*Common Frame; Square or Round End per doz., 1¾ in., 15c.; 2 in., 16c*
*Auger Mortise, no Face Plate, per doz., 1¾ in., 12c.; 2 in., 15c.*
*Auger Mortise, with Face Plate, per doz., 1¾ in., 15c.; 2 in., 15½c.*

Acme.....1¼ in., 16¢; 2 in., 19¢
Common Sense, 1¼ in.... ₱ doz., 18¢; 2 in., 20¢.
Fox-All-Steel, Nos. 3 and 7, 2¼ in.....₱ doz. 25¢
No. 9, 1¾ in.....₱ doz. 30¢
Extra for Plated Finish...₱ doz. 20¢
Extra for Anti-Friction Bronze Bushing.....₱ doz 10¢
Grand Rapids All Steel Nolseless.....40%
Ideal No. 13.....1¾ in. ₱ doz.. 16¢
Niagara.....1¼ in.. 16¢; 2 in.. 19¢
No. 36, Troy....1¾ in., 14½¢; 2 in., 16½¢
Star.....1¼ in.. 16¢; 2 in., 19¢
Tackle Blocks—See *Blocks.*

## Pumps—

*Cistern*.....60@60&10%
*Pitcher Spout*.....75@75&10%
*Wood*.....50@50&10%
*Pump Leathers, Lower and Plunger Valves—Per gro.:*

| *Inch..* | 2 | 2¼ | 2½ | 2¾ |
|---|---|---|---|---|
| | $2.20 | 2.50 | 2.75 | 3.00 |
| *Inch..* | 3 | 3¼ | 3½ | 3¾ | 4 |
| | $3.30 | 3.60 | 3.85 | 4.10 | 4.40 |

Barnes Dbl. Acting (low list).....50%
Flint & Walling's Fast Mail (low list).50%
Flint & Walling's Pitcher Spout.....75%
Loud's Suction Pumps, U. S. Co.....20%
Myer's Pumps, low list .....50%
Contractors' Rubber Diaphragm Non-chokable, B. & L. Block Co.....30%

## Punches—

*Revolving (4 tubes)...doz. $3.75@4.25*
*Saddlers' or Drive, good...doz. 65@70¢*
*Spring, single tube, good quality... $1.65@1.75*
Bemis & Call Co.'s Cast Steel Drive....50%
Bemis & Call Co.'s Check.....55%
Bemis & Call Co.'s Spring.....50%
Niagara Hollow Punches.....40%
Niagara Solid Punches.....55&10%
Steel Screw, B & K. Mfg. Co.....40%
Tinners' Hollow, P., S. & W. Co.....35@35&5%
Tinners' Solid, P., S. & W.Co., ₱ doz., $1.44.....60%

## Rail— Barn Door, &c.—

*Cast Iron, Barn Door: Flange Screw Holes for Rd. Groove Wheels:*

| ⅛ | ⅝ | ¾ | In. |
|---|---|---|---|
| $1.70 | $2.10 | $5.00 | 100 feet. |

*Angular for Sq. Groove Wheels:*

| *Small.* | *Med.* | *Large.* | |
|---|---|---|---|
| $1.60 | 1.95 | 2.70 | 100 feet. |

*Sliding Door, Brnzed Wr't Iron, ft.5½¢*
*Sliding Door, Iron Painted....2½@3¢*
*Sliding Door, Wrought Brass, 1½ in.....lb. 36¢..30%*
Cronk's Double Braced Steel Rail, ₱ foot.....3½¢
Cronk's O. N. T. Rail.....3½¢
Lanes' O. N. T., ₱ 100 ft., 1 inch....$2.85
Lanes' Standard, ₱ 100 ft.....3.75
Lawrence Bros.' .....₱ ft. 4¼¢
McKinney's None Better.....₱ ft. 3½¢
McKinney's Standard.....₱ ft. 4 ¢
Stowell's Cast Rail.....1½¢
Stowell's Steel Rail, Plain.....2½
Stowell's Wrought Bracket, Plain....3½¢

## Rakes—

*Net Prices, Malleable Rakes:*

| | 10 | 13 | 14 | 16-tooth |
|---|---|---|---|---|
| *Shank* | $1.50 | 1.60 | 1.75 | 1.85 |
| *Socket* | $1.65 | 1.80 | 1.95 | 2.10 |

*Sept. 1, 1900, List:*
*Cast Steel*.....70¢5¢&5%
*Malleable*.....70¢10@75¢5%
*Lawn Rakes, Metal Head, per doz.,*
*20 teeth*.....$3.25@3.50
*24 teeth*.....$3.60@3.75
Fort Madison Red Head Lawn.....$3 25
Fort Madison Blue Head Lawn.....$3.00
Jackson Lawn, 29 and 30 teeth.....₱ doz. $4.00
Kohler's:
Lawn Queen, 20-tooth, ₱ doz.....$2.60
Lawn Queen, 24-tooth, ₱ doz.....$3.75
Paragon, 20-tooth, ₱ doz.....$2.85
Paragon, 24-tooth, ₱ doz.....$3.00
Steel Garden, 14-tooth, ₱ doz.....$3.00
Malleable Garden, 14-tooth ₱ doz. $2.25

## Rasps, Horse—

Disston's.....75%
Heller Bros.....70&5%
McCaffrey File Co. Horse Rasps.60&10&5%
New Nicholson Horse Rasp.....70&10%
See also *Files.*

## Razors—

Boracic.....70%
Fox Razors, No. 42... ₱ doz. $30.00
Fox Razors, No 44.. ₱ d oz $24.00 } 40%
Fox Razors, No. 82, Platina, ₱ doz. $24.00 }
Silberstein:
Carbo Magnetic.....$18.00
Griffon, No. 65.....$15.00
Griffon, No. 00.....$12.00
All other Razors.....40%
Safety Razors.....40%

## Razor Strops—

See *Strops, Razor.*

## Reels— Fishing—

Hendryx Aluminum, German Silver, Gold, Bronze, Silver, Rubber, Populo and Salmon, Single Action, Multiplying and Quadruple, all sizes.....25%
Hendryx Single Action Series, 102P and PN, 202P and PN, 102 PR and PRN, 202 PR and PRN, 304 P and PN, 00304P and PN, 502 and 502N, 802 and 802N, 02084N, Competitor.50%
Hendryx Multiplying and Quadruple Series, 3004N and PN, 4N and PN, 2904N, 2904Pand PN, 00290&PN, 0024 and 0924N, 5009N and PN.....40&10%
Shakespeare, Style C.....25%

## Registers—

*List Sept. 2, 1901.*

*Black Jap*
*White Jap*
*Bronzed*
*Nickel Plated*
*Electro Plated*
} 60&10&5% & 70&10&5%

*There is a good deal of irregularity in prices of Registers, especially in Black Japanned, and some jobbers and manufacturers are using the old list.*

## Revolvers—

*Single Action*.....80@85c
*Double Action*.....$1.80
*Automatic*.....$2.75
*Hammerless*.....$2.25

## Riddles, Grain or Sand—

*16 in. per doz*.....$2.00@$2.25
*17 in. per doz*.....$2.25@$2.50
*18 in. per doz*.....$2.50@$2 75

## Rings and Ringers—

### Bull Rings—

| *2* | *2½* | *3 Inch.* |
|---|---|---|
| *Steel*.....$0 80 | 0.90 | 0.95 doz. |
| *Copper*..... 1.10 | 1.20 | 1.50 doz. |

### Hog Rings and Ringers—

*Hill's Rings....gro. boxes, $4.00@4.50*
*Hill's Ringers, Gray Iron, doz. 50@55c*
*Hill's Ringers, Mal. Iron, doz. 75@80c*
*Blair's Rings.....per gro. $5.75@6.00*
*Blair's Ringers...per doz. $0.65@ .70*
*Brown's Rings....per gro. $6.00@6.25*
*Brown's Ringers..per doz. $1.00@1.10*
Rapid Rings.....₱ gro. $6.00
Rapid Ringers.....₱ doz. $0.50

## Rivets and Burrs—

*Copper*.....50@50&5%
*Iron or Steel:*
*Tinners'*.....70@70&10%
*Miscellaneous*.....70@70&10%

## Rivet Sets—See *Sets.*

## Roasting and Baking Pans—See *Pans, Roasting and Baking.*

## Rollers—

Acme, Stowell's Anti-Friction.....50%
Barn Door, Sargent's list.....50&10&10%
Cronk's Stay.....64¾%
Cronk's Brinkerhoff.....66⅔%
Lane's Stay.....33⅓%
Stowell's Barn Door Stay...₱ doz. $1.25

## Rope—

*Manila, 7-16 in. and larger*
*lb. 12¾@13 c*
*Manila.....¾ inch.....lb. 13¼@13½c*
*Manila ¼ & 5-16 in.....lb. 13¾@14 c*
*Manila, Tarred Rope, 15 thread.....lb. 12¾@13 c*
*Manila Hay Rope.*
*Medium*.....*lb. 12¾@13 c*
*Sisal, 7-16 in. and larger lb. 8¼@ 8¼c*
*Sisal.....¾ inch...lb. 9 @ 9¼c*
*Sisal ¼ and 5-16 in.....lb. 9¼@ 9¾c*
*Sisal, Hay Rope, 2 to 10 ply*.....*lb. 8¾@ 9 c*
*Sisal, Tarred, Medium Lath Yarn*.....*lb. 8½@ 8¾c*
*Cotton Rope:*
*Best.....¼-in. and larger lb. 13½c*
*Medium ..¼-in. and larger lb. 11 c*
*Com.....¼-in. and larger lb. 9 c*
*Jute Rope:*
*Thread No. 1, ¼ in. and up lb. 6½c*
*Thread No. 2, ¼ in. and up lb. 6 c*
*Yarn, ¼ in and up..... lb. 5 c*

## Wire Rope—

*Galvanized*.....35c&7½&5%
*Plain*.....30c&7½&5%

## Ropes, Hammock—

Covert Mfg. Co.....45&2%
Covert Saddlery Works.....60&5%

## Rules—

*Boxwood*.....75c&10c&10c&10@75c&10 c&10c&10c&5%
*Ivory*.....35c&10c&10@35c&10c&10c&5%
Chapin-Stephens Co.:
Boxwood.....75&10&10@75&10&10&10%
Ivory.....35&10@35&10&10%
Lufkin's Steel.....50&10%
Lufkin's Lumber.....50&10%
Stanley R. & L. Co.:
Boxwood...75&10&10@75&10&10&10%
Ivory.....35&10@35&10&10%
Upson Nut Co.:
Boxwood...75&10&10@75&10&10&10%
Ivory.....35&10@35&10&10%

## Sad Irons—See *Irons, Sad.*

## Sand and Emery Paper and Cloth—

See *Paper and Cloth.*

## Sash Cords—See *Cord, Sash.*

## Sash Locks—See *Locks, Sash.*

## Sash Weights—

See *Weights, Sash.*

## Sausage Stuffers or Fillers—See *Stuffers or Fillers Sausage.*

## Saw Frames—See *Frames, Saw.*

## Saw Sets—See *Sets, Saw.*

## Saw Tools—See *Tools, Saw.*

## Saws—

Atkins:
Circular.....50@50&10%
Band.....50&10@60%
Cross Cuts.....35&5%
Mulay, Mill and Drag.....50&10%
One-Man Saw.....40%
Wood Saws.....40%
Hand, Compass, &c.....40%
Disston's:
Circular Solid and Inserted Tooth.50%
Band 9 to 14 in. wide.....60%
Band ¼ to 1¾.....70%
Crosscuts.....45@45&10%
Narrow Crosscuts.....50@50&10%
Mulay, Mill and Drag.....50%
Framed Woodsaws.....35@35&7½%
Woodsaw Blades.....40@40&7½%
Woodsaw Rods.....25%
Hand Saws, Nos. 12, 99, 9, 16, d100, D8, 120, 76, 77, 8.....25@25&7½%
Hand Saws, Nos 7, 107, 107½, 3, 1, 0, 00, Combination.....30@30&7½%
Compass, Keyhole, &c.....25@25&7½%
Butcher Saws and Blades..35@35&7½%
C. E. Jennings & Co.'s.:
Back Saws.....35%
Butcher Saws.....35%
Compass and Key Hole Saws.....25%
Framed Wood Saws.....40%
Hand Saws.....25@30%
Wood Saw Blades.....45%
Peace:
Circular and Mill.....50%
Cross Cuts, list Jan. 1, '99.....50%
Hand, Panel and Rip.....30%
Richardson:
Circular and Mill.....50%
Hand, &c.....30%
X Cuts, list Jan. 1, '99.....50%
Simonds':
Circular Saws.....50%
Crescent Ground Cross Cut Saws..35%
One-Man Cross Cuts.....40&10%
Gang Mill, Mulay and Drag Saws..50%
Band Saws.....50%
Back Saws.....25@25&7½%
Butcher Saws.....35@35&7½%
Hand Saws.....25@25&7½%
Compass, Keyhole, &c.....25@25&7½%
Wood Saws.....35@35&7½%

## Hack Saws—

Disston:
Concave Blades.....25%
Keystone.....30%
Hack Saw Frames.....30%
C. E. Jennings & Co.'s:
Hack Saw Frames, Nos. 175, 180, 330.....40%
Hack Saws, Nos. 175, 180, 330, complete.....40%
Griffin's Hack Saw Frames.....45%
Griffin's Hack Saw Blades.....45%
Star Hack Saws and Blades.....15&10%

## Scroll—

Barnes' No. 7, $15.....25%
Barnes' Scroll Saw Blades.....40%
Barnes' Velocipede Power Scroll Saw, without boring attachment, $18; with boring attachment, $20.....20%
Lester, complete, $10.00.....15&10%
Rogers, complete, $4.00.....15&10%

## Scale Beams—

See *Beams, Scale.*

## Scales—

*Family, Turnbull's*.....30@30&10%
*Counter:*
*Hatch. Platform, ½ oz to 4 lbs. doz $5.50*
*Two Platforms, ½ oz to 8 lbs. doz. $16*
*Union Platform, Plain..$1.70@1.90*
*Union Platform, Striped $1.85@2.15*
Chatillon's:
Eureka.....25%
Favorite.....40%
Grocers' Trip Scales.....50%
Pelouze Scales—Household, Counter, Confectionery, Postal, Ice, &c.....50%
"The Standard" Portables.....45%
"The Standard" R. R. and Wagon....50%

## Scrapers—

*Box, 1 Handle*.....*doz $2.25@2.50*
*Box, 2 Handle*.....*doz. $3.75@4.00*
*Ship, No. 1, doz. $3.50; No 2, $2.25@2.40*
Adjustable Box Scraper (S. R. & L. Co.) $6.00.....30&10%

## Screens, Window, and Frames—

Bonanza Window Screens.....60@60&5%
Cortland Victor Screens.....60@60&5%
Flyer Pattern Window Screen..60@60&5%
Maine Window Screen Frames.40&10&5%
Perfection Window Screens.....60@60&5%
Phillips' Window Screen Frames.....60&10&5%
Porter's Hummer Window Screens..60@60&5%
Porter's Klondike Window Screens .....60&2½@60&10&5%
Wabash Spring Adj. Screen.....50%
See also *Doors.*

## Screw Drivers—

See *Drivers, Screw.*

## Screws—Bench and Hand—

*Bench, Iron..doz. 1 in., $3.00@3.25; 1¼, $3.50@3.75; 1¼, $4.00@4 50*
*Bench, Wood, Beech..doz. $3.50@2.75*
*Hand, Wood*.....*30&5@40%*
Hand, R. Bliss Mfg. Co.....35%

## Coach, Lag and Hand Rail—

*Lag, Common Point, list Oct. 1, '99*.....*75¢5@..%*
*Coach and Lag, Gimlet Point, list Oct. 1, '99*.....*75@..%*
*Hand Rail, list Jan. 1, '81.60¢10@..%*

## Jack Screws—

*Standard List*.....*75@75&10%*
Millers Falls.....50&10&10%
Millers Falls, Roller.....50&10%
P., S. & W.....50&50&5%
Sargent.....70&10%

## Machine—

*List Jan. 1, '98.*
*Flat or Round Head, Iron.50@50&10%*
*Flat or Round Head, Brass50@50&10%*

## Set and Cap—

*Set (Iron or Steel)*.....*70¢10¢10%*
*Sq. Hd. Cap*.....*65¢10¢10%*
*Hex. Hd. Cap*.....*65¢10¢10%*
*Rd. or Fillister Hd. Cap...60¢10¢10%*

## Wood—

*List Jan. 1, 1900.*
*Manufacturers' printed discounts:*
*Flat Head, Iron*.....*87½@90%*
*Round Head, Iron*.....*85@87½%*
*Flat Head, Brass*.....*85@87½%*
*Round Head, Brass*.....*82½@85%*
*Flat Head, Bronze*.....*75@80%*
*Round Head, Bronze*.....*72½@77½%*
*Drive Screws*.....*87½@90%*
NOTE.—*Extra 5@10% often given.*

## Scroll Saws—See *Saws, Scroll.*

## Scythes—

*Per doz.*
*Clipper Pattern, Grass*.....*$4.25*
*Full Polished Clipper*.....*$4.75*
*Grain*.....*$7.00*
*Clipper, Grain*.....*$7.50*
*Wood and Bush*.....*$4.50*

## Scythe Snaths—

See *Snaths, Scythe.*

## Seeders— Raisin—

Enterprise.....35@30%

## Sets— Awl and Tool—

*Brad Awl and Tool Sets:*
*Wood Hdle., 10 Awls doz. $2.00@2 25*
*Wood Hdle., 14 Awls, 6 Tools doz. $2.50@2.60*
Aiken's Sets, Awl and Tools:
No. 20, ₱ doz. $10.00.....50&10&10%
Fray's Adj. Tool H dls...Nos. 1, $12; 2, $18; 3, $12; 4, $9; 5, $7.....50%
Millers Falls Adj. Tool H'dls, No. 1, $12; No. 4, $12; No. 5, $18 .... 15&10%
Stanley's Excelsior:
No. 1, $7.50; No. 2 $4.00; No. 3, $5.50.....30&10@30&10&10%

## Garden Tool Sets—

Ft. Madison Rakes, Shovel and Hoe.....₱ doz.....$9.00

## Nail—

*Square*.....*per gro. $2.50*
*Round, B'k. and Pol., assorted*.....*gro. $1.80@2.50*
*Octagon*.....*gro. $4.25@4.75*
*Knurled, Good*.....*gro. $6.00@6.50*
Buck Brothers.....37½%
Cannon's Diamond Point, ₱ gr. $13...35%
Mayhew's.....per gro. $9.00
Snell's Corrugated, Cup Pt. per gro. $7.50
Snell's Knurled, Cup Pt....per gro $7.50

## Rivet—

*Regular list*.....*70@70&10&5%*

## Saw—

Aiken's:
Genuine.....₱ doz. $5.50@6.00
Imitation.....₱ doz. $3.00@3.10
Atkin's, :
Criterion.....40%
Adjustable.....40%
Bemis & Call Co's.:
Cross Cut.....30%
Hammer, new Pat.....45%
Plate.....20%
Spring Hammer.....30%
Disston's Star and Monarch.....25%
Morrill's No. 1, $15.00.....40&20%
Nos. 3 and 4, Cross Cut, $23...50&20&5%
No. 5, Mill, $31.00.....50&30&10%
No. 10, $15.50.....40&20%
No. 11, $16.00.....40&20%
Taintor Positive, ₱ doz. $18.....60%

## Sharpeners Knife—

Chicago Wheel & Mfg. Co.....5%
Smith & Hemenway Co.....70&5%
Tanite Mills ₱ gross, $14.40....25@33⅓%

## Sharpeners Skate—

Eureka Skate Sharpener.....₱ doz. $2.00

## Shaves, Spoke—

*Iron*.....*doz. $1 00@1.25*
*Wood*.....*doz. $1.75@2.00*
Bailey's (Stanley R. & L. Co.).....50&10%
Goodell's, ₱ doz. $9.00.....15&10%

## Shears—

| *Cast Iron...* | *7* | *8* | *9 in.* |
|---|---|---|---|
| *Best* | $16.00 | 18.00 | 20.00 gro. |
| *Good* | $13.00 | 15.00 | 17 00 gro. |
| *Cheap* | $5.00 | 6.00 | 7.00 gro. |

*Straight Trimmers, &c.:*
*Best quality, Jap*.....*70@70&10%*
*" Nickel*.....*60@60&10%*
*Fair qual. Jap*.....*80@80&5%*
*" Nickel*.....*75@75&10%*
*Tailors' Shears*.....*40@40&10%*
Acme Cast Shears.....40&40&5%
Heinisch's Tailors' Shears.....40%
Wilkinson's Hedge.....50%
Wilkinson's Sheep.....1900 list, 50%

## Tinners' Snips—

*Steel Blades*.....*20&10%*
*Steel Laid Blades*.....*40&10%*
Forged Handles, Steel Blades, Berlin..40@40&10%
Jennings & Griffin Mfg. Co's. 7 to 10 inch.....50%
Niagara Snips.....40%
P. S. & W. Co.....30%

## Pruning Shears and Tools—

Cronk's Grape Shears.....33⅓%
Cronk's Pruning Shears.....33⅓%
Disston's Combined Pruning Hook and Saw, ₱ doz. $18.00.....25@25&10%
Disston's Pruning Hook, ₱ doz. $12.00 .....25@25&10%
John T. Henry Mfg. Company Pruning Shears, all grades..40@40&5%
Orange Shears.....50&10&50&20%
Grape.....40&10@50%
Tree Pruners.....75%
Nagley's Pruning Shears.....10&5%
P., S. & W. Co.....33⅓%

## Sheaves—Sliding Door—

Stowell's Anti-Friction.....50%
Patent Roller Hatfield's, Sargent's list, 75&10&10%
Reading.....70&10@75%
R. & E. list.....33⅓%
Wrightsville, Hatfield Pattern.....50%

## Sliding Shutter—

Reading list.....70&10@75%
R. & E. list.....33⅓%
Sargent's list.....50&16⅔&10%

## Shells— Shells, Empty—

Brass Shells, Empty:
First quality, all gauges.....60&5%
Climax, Club, Rival, 10 and 12 gauge, 65&5%
Paper Shells, Empty:
Acme, Ideal, Leader, New Rapid, Smokeless 10, 12, 16 and 20 gauge, 33⅓&10%
Blue Rival, New Climax, Primrose Club, Yellow Rival, 10, 12, 16 and 20 gauge.....15%
Climax, Club, League, Rival, 14, 16 and 20 gauge ($7.50 list)...20&5%
Climax, Club, League, Rival 10 and 12 gauge.....25&5%
Defiance, High Base, New Victor, Nitro, Repeater, 10, 12 16 and 20 gauge.....15%
Trap and Metal Lined, 10, 12, 16 and 20 gauge.....33⅓&10&5%

## Shells, Loaded—

*Loaded with Black Powder*.....*40&5%*
*Loaded with Smokeless Powder, medium grade*.....*40&10&5%*
*Loaded with Smokeless Powder, high grade*.....*40&10&10&5%*

## Shoes, Horse, Mule, &c.—

*F. o. b., Pittsburg.*
*Iron*.....*per keg $3.50*
*Steel*.....*per keg $3.25*
Burden's, all sizes, ₱ keg.....$3.60

## Shot—

*Drop, up to B, 25-lb. bag*.....*$1.85*
*Drop, B and larger, per 25-lb. bag*.....*$1.80*
*Buck, 25-lb. bag*.....*$1.60*
*Chilled, 25 lb. bag*.....*$1.60*
*Dust Shot, 25-lb. bag*.....*$2.10*
Markle's Chilled.....$1.65
Raymond Chilled.....$1.60

## Shovels and Spades—

*Association list*.....*40%*
*Note.—Common Plain Back Shovels are generally sold by jobbers at $6.75@7.00.*

## Sieves and Sifters—

*Hunter's Imitation, gro. $11.00@11.50*
Buffalo Metallic Blued, S. S. & Co., ₱ gr.:

| 14&16 | 16&18 | 18&20 |
|---|---|---|
| $12.90 | $13.80 | $15.00 |

F. J. Meyers' Mfg. Co.:
Eclipso..... ₱ gr. $11.00
Electric Light..... ₱ gr. $11.00
Hunter's Genuine..... ₱ gr. $12.50
No Name, Hunter's..... ₱ gr. $11.00
Standard..... ₱ gr. $11 00
Shaker (Barler's Pat.) Flour Sifters.. ₱ doz., $2.00..... 90%

## Sieves, Tin Rim—

*Per dozen*

| Mesh | 14 | 16 | 13 | 20 |
|---|---|---|---|---|
| Black, full size | $0 95 | .98 | 1.00 | 1.10 |
| Plated, full size | .$1.05 | 1.08 | 1.10 | 1.20 |
| Black, scant | $0.78 | .80 | .83 | |

## Sieves, Wooden Rim—

*Nested, 10, 11 and 12 Inch.*
*Mesh 18, Nested, doz.....$0.65@0.75*
*Mesh 20, Nested, doz..... .75@ .85*
*Mesh 24, Nested, doz..... .90@1.00*

## Sinks—

### Cast Iron—

*Standard list.....65&10@70..%*
NOTE.—*There is not entire uniformity lists used by jobbers.*

### Wrought Steel—

New Era, Galv'd and Enameled...70&5%
New Era, Plated.....60&10%
L. & G. Mfg. Co., Galvanized.....50%
L. & G. Mfg. Co., Enameled.....50%

## Skeins, Wagon—

*Cast Iron.....70&10@75%*
*Malleable Iron.....50&10@50%*
*Steel.....50@40&10%*

## Slates—

*Factory Shipments.*
*"D" Slates..... 50&10&10&10%*
*Unexcelled, etc., Noiseless Slates.60 & 8 tens %*
*Victoria, etc., Noiseless Slates..60& 7 tens &5%*
*Wire Bound.....50&10&5%*
*Web Hinge..... 5%*

## Slaw Cutters—See *Cutters.*

## Slicers, Vegetable—

Sterling ₱ 2.00..... ....33⅓

## Snaps, Harness—

*German.....40@40&10%*
Covert Mfg. Co.:
Decoy.....35&2%
High Grade.....45&2%
Jockey.....40&2%
Trojan.....45&2%
Yankee.....35&2%
Yankee, Roller.....30&2%
Covert's Saddlery Works:
Crown.....60%
German.....60%
Model.....60%
Triumph.....60%
W. & E. T. Fitch Co.:
Bristol.....40&10%
Empire.....50&5%
German.....40%
National.....50&5%
Perfect.....40%
Clipper.....50&5%
Champion.....40%
Security.....40%
Victor.....60&5%
Oneida Community:
No. 0 Steel.....65@65& 0%
Solid Swivels.....65&10@45&10&10%
Sargent's Patent Guarded.....66⅔&10%

## Snaths—

*Scythe.....50@50&10%*

## Snips, Tinners'—See *Shears*

## Soldering Irons—

See *Irons, Soldering.*

## Spoke Trimmers—

See *Trimmers, Spoke.*

## Spoons and Forks—

### Silver Plated—

*Good Quality.....50&10@60&10&5%*
*Cheap..... ...40@50&10%*
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton.....40&10%
Rogers & Bro., William Rogers Eagle Brand.....5&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%
Simeon L. & Geo. H. Rogers Co.:
Silver Plated Flat Ware.....60%
No. 17 Silver Plated Ware.....60&10%

### Miscellaneous—

*German Silver.....60&10@60&10&10%*
Simeon L. & Geo H. Rogers Co.:
German or Nickel Silver, Special list 1 &10%

### Tinned Iron—

*Teas.....per gro. 45@5.c*
*Tables.....per gro. 90c@$1.00*

## Springs—

### Door—

Gem (Coil).....20%
Star (Coil).....30%
Torrey's Red, 30 in.... ₱ doz. $1.10@1.25
Victor (Coil).....50&10&10%

## Carriage, Wagon, &c.

*1¼ in. and Wider:*
*Black or ⅛ Bright, lb.....4¼c*
*Bright, lb.....5¼c*
*Painted Seat Springs:*
*1½ x2x 26 and smaller, per pr 48@53c*
*1½ x 2 x 28 per pr.. .....56@61c*
*1½ x 3 x 28 and narrower, per pr. .....75@80c*
Cliff's Springs:
Bolster.....40%
Seat.....per pair 50c
Pole..per pair, ⅝ in. $1 10; ¾ in. $1.25

## Sprinklers, Lawn—

Enterprise.....25@20%
Philadelphia No. 1, ₱ doz. $12; No. 2, $15; No. 3, $24.....30%

## Squares—

*Nickel plated....* } *List Jan. 5, 1900*
*Steel and Iron...* } .....70&10@75%
*Rosewood Hdl Try Square and T-Bevels .....60&10&10@70%*
*Iron Hdl. Try Squares and T-Bevels. .....40&10@40&10&10%*
Disston's Try Sq. and T-Bevel's.....60&10%
Winterbottom's Try and Miter.....50&10%

## Squeezers—

### Lemon—

*Wood, Common, gro., No. 0, $5.25 @$5.50; No. 1, $6.25@$6.50.*
*Wood, Porcelain Lined:*
*Cheap .....doz. $2.50@2.75*
*Good Grade.....doz. $3.00@3.50*
*Tinned Iron.....doz. $0.75@1.25*
*Iron, Porcelain Lined doz. $2.90@3.25*
Jennings' Star..... ₱ doz. $1.85@1.90

## Staples—

*Barbed Blind .....lb. 6@6¼c*
*Electricians', Association list..... 80&10&10&10%*
*Fence Staples, same price as Barbed Wire. See Trade Report.*
*Poultry Netting, Staples....per lb.. 5¼@5¾c*
Grand Crossing Tack Co.'s list....80&10%

## Steels, Butchers'—

Dick's.....30%
Foster Bros'.....30%
Hartzell Cutlery Co.....40&5%
C. & A. Hoffmann's.....40%

## Steelyards.....25@25&10%

## Stocks and Dies—

*Blacksmiths'.....40@40&10%*
Gardner Die Stocks No. 1.....50%
Gardner Die Stocks, larger sizes.....40%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25&30%
Curtis Reversible Ratchet Die Stock.25%

## Stone—

### Scythe Stones—

Chicago Wheel & Mfg. Co:
Gem Corundum, ½ inch, $8.00 per gro., 12 inch, $10.
Pike Mfg. Co. 1901 list:
Black Diamond S. S.... ₱ gro. $12.00
Lamoille S. S..... ₱ gro. $11.00
White Mountain S. S.... ₱ gro. $9.00
Green Mountain S. S. ₱ gro. $6.00
Extra Indian Pond S. S. ₱ gro. $7.50
No. 1 Indian Pond S. S.. ₱ gro. $7.00
No. 2 Indian Pond S. S.. ₱ gro. $4.50
Leader Red End S. S.... ₱ gro $4.50
Balance of 1901 list 33⅓%

### Oil Stones, &c.

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit.....50%
Gem Corundum Axe, Single or Double Grit.....55%
Gem Corundum Slips.....55%
Gem Corundum Razor Hones.....50%
Pike Mfg. Co. 1901 list: ₱ lb
Arkansas Stone, No. 1, 3to5 in. $2.80
Arkansas Stone, No. 1, 5 to 6 in. $3.50
Arkansas Stone No. 1.....$4.00
Lily White Washita 4 to 8 i .....60¢
Rosy Red Washita, 4 to 8 in .....60¢
Washita Stone, Extra, 4 to 8 in..50¢
Washita Stone, No. 1, 4 to 8 in..40¢
Washita Stone, No. 2, 4 to 8 in..30¢
Lily White Slips.....90¢
Rosy Red Slips.....90¢
Washita Slips, Extra.....80¢
Washita Slips, No. 1.....70¢
India Oil Stones (entire list).....25%
Hindostan No. 1, Regular.... ₱ lb 8¢
Hindostan No. 1 Small..... ₱ lb 10¢
Axe Stones (all kinds).....33⅓%
Turkey Oil Stones, ex. 5 to 6 in. ₱ lb 8¢
Queer Creek Stones, 4 to 8 in.....30¢
Queer Creek Slips.....90¢
Sand Stone.....5¢ 40%
Belgian, German and Swaty Razor Hones.....40%
Natural Grit Carving Knife Hones, ₱ doz.....$3.00
Quick Edge Pocket Knife Hones, ₱ doz.....$2.00
Mounted Kitchen Sand Stone, ₱ doz.....$1.50
Tanite Mills:
Emery Oil, ₱ doz. $5.00.....50@60%

## Stoners—

### Cherry—

Enterprise.....25@30%

## Stops, Bench—

Millers Falls..... 15&10%
Morrill's... ₱ doz., No. 1, $10.00..50&20%
Morrill's, No. 2, $11.00.....50&10%

## Stops, Window—

Ives' Patent.....25&5%

## Stove Boards—

See *Boards, Stove.*

## Stove Polish—See *Polish, Stove.*

## Strainers, Pump—

Diamond Joe Pump Strainers..per doz. 75¢

## Straps, Box—

Cary's Universal case lots.....20&10%

## Stretchers, Carpet—

*Cast Iron, Steel Points...doz. 55@65c*
*Socket.....doz. $1.75*

## Strops, Razor—

Smith & Hemenway Co..... .....70%

## Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Mfg. Co., list Jan. 1, '97.....30%

# Tacks Brads, &c.—

*List Jan. 15, '99.*
*Carpet Tacks, American 90@25@....%*
*American Cut Tacks....90@20@....%*
*Swedes Iron Tacks .....90@30@....%*
*Swedes Upholsterers' Tacks..... 90@40@....%*
*Gimp Tacks.....90@30@....%*
*Lace Tacks.....90@40@....%*
*Trimmers' Tacks.....90@25@....%*
*Looking Glass Tacks.....70&10%*
*Bill Posters' and Railroad Tack.... 90@40@....%*
*Hungarian Nails.....80&15%*
*Common and Patent Brads....80&10%*
*Trunk and Clout Nails.....80&5%*

NOTE.—*The above prices are for Straight Weights.* An extra 5% is given Star Weights** and an extra 10&5% on Standard Weights.****

### Miscellaneous—

*Double Point Tacks.....90&6 or 7 tens*
*Steel Wire Brads, R. & E. Mfg. Co.'s list.....50&10@60%*
See also *Nails, Wire.*

## Tanks, Oil—

Emerald, S. S. & Co.....30-gal. $3.20
Emerald, S. S. & Co.....60-gal., $4.00
Queen City S. S. & Co., 30-gal.....$3.50
Queen City S. S. & Co., 60-gal.....$4.25

## Tapes, Measuring—

*American Asses' Skin.....40&10@50%*
*Patent Leather.....25@5&5%*
*Steel.....40@40&5%*
*Chesterman's.....25@25&5%*
Eddy's Steel.....40@40&5%
Eddy's Metallic.....33⅓@33⅓&5%
Keuffel & Esser Co., Steel and Metallic, Lower list, 1899.....35%
Lufkin's Steel.....33⅓@35%
Lufkin's Metallic.....30@30&5%

## Teeth Harrow—

*Steel Harrow Teeth, plain or headed, bas per lb.....2¼c*

## Thermometers—

*Tin Case.....30&10@30&10&5%*

## Ties, Bale—Steel.

*Standard Wire.....50&10&5%*

## Ties, Wall—

Cleveland Wire Spring Co.:
Galv. Steel 5-32 x 6¼ in. ₱ 1000..$10.00
Galv. Steel 5-32 x 8½ in. ₱ 1000..$11.00
Galv. Steel 5-32 x 11¼ in ₱ 000 $12.00
Galv. Steel 5 32 x 15½ in. ₱ 1000 $14.00

## Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

## Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

## Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire*

## Tobacco Cutters—

See *Cutters, Tobacco.*

## Tools—

### Coopers'—

L. & I. J. White .....20@20&5%

### Saw—

Atkins' Cross Cut Saw Tools.....40%
Simonds' Improved.....33⅓&5%
Simonds' Crescent..... .....25%

### Ship—

L. & I. J. White..... .....25%

## Transom Lifters—

See *Lifters, Transom.*

## Traps—Fly—

*Balloon, Globe or Acme.... ..... doz. $1.15@1.25; gro. $10.50@11.00*
*Harper, Champion or Paragon ... doz. $1.25@1.40; gro. $12.00@13 50*

### Game—

*Oneida Pattern.....75¢10¢5@80¢5%*
Newnouse.....45@45&5%
Hawley & Norton.....65&5@65&10%
Victor (Oneida Pattern).....75@75&5%
Star (Blake Pattern).....60@5@60&10%

### Mouse and Rat—

*Mouse, Wood, Choker, doz. holes.... 8½@9c*
*Mouse, Round or Square Wire..... doz. $0.85@1.00*
American Pattern French Rat and Mouse Traps—
No. 1, Detroit Marty Pattern, ₱ doz. $4.50; in ½ gro. lots, ₱ doz.....$4.00
No. 2, Detroit Marty Pattern, ₱ doz. $3.25; in ½ gro. lots, ₱ doz.....$3.00
Detroit Marty Pattern Mouse, ₱ doz. $2.00; in ½ gro. lots, ₱ doz..... $1.75
Diamond Joe Mouse Traps....per doz. 60¢
Diamond Joe Rat Traps..... per doz. $1.00
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, Each $1 12½;.. ₱ doz. $12.00
No. 3, Rat, ₱ doz. $6.00; case of 50 $5.25 doz.
No. 3½, Rat ₱ doz. $4.75; case of 72 $4.25 doz.
No. 4, Mouse, ₱ doz. $3.50; case of 72 $2.75 doz.
No. 5, Mouse ₱ doz $2.75; case of 150 $2.25
Schuyler's Rat Killer, No. 1, ₱ gr. $30.00; No. 2, ₱ gr. $30.00; Mouse, No. 3, $18.00.....50%

### Target—

Markle's, each..... ..$5.50

## Trimmers, Spoke—

Bonney's Nos. 1 and 2..... 40%

## Trowels—

Diston Brick and Point'ng..... .....30%
Diston Plasterins.....25%
Diston "Standard Brand" and Garden Trowels.....40%
Never-Break Steel Garden Trowels.. gro. $7.00
Peace's Plastering .....30%
Rose Brick and Plastering.....25&5%
Woodrough & McParlin, Pl'st'ring.....25%

## Trucks, Warehouse, &c.—

B. & L. Block Co.'s list.....50%
Daisy Stove Trucks, Improved pattern ₱ doz. $18.50
Model Stove Trucks..... ₱ doz. $18.50

## Tubs, Wash—

| | No. 1 | 2 | 3 |
|---|---|---|---|
| *Galvanized, per doz.* | *$5.00* | *5 50* | *6.00* |

Galvanized Wash Tubs (S. S. & Co.):

| No. | 1 | 2 | 3 | 10 | 20 | 30 |
|---|---|---|---|---|---|---|
| Per doz. | $5 25 | 6.00 | 6.75 | 6.50 | 7 25 | 8.00 |

## Twine—

### Miscellaneous—

| *Flax Twine—* | *BC* | *R.* |
|---|---|---|
| *No. 9, ¼ and ½-lb. Balls..* | *22c* | *24c* |
| *No. 12, ¼ and ½-lb. balls..* | *18c* | *20c* |
| *No. 18, ¼ and ½-lb. Balls..* | *16c* | *18c* |
| *No. 24, ¼ and ½-lb. Balls* | *15½c* | *17½c* |
| *No. 36, ¼ and ½-lb. Balls..* | *15c* | *17c* |
| *Chalk Line, Cotton, ½-lb Balls.... 22@22½c* | | |
| *Cotton Mops, 6, 9, 12 and 15 lb. to doz..... 7@8c* | | |
| *Cotton Wrapping, 5 Balls to lb .... according to quality...10¼c@17c* | | |
| *American 3-Ply Hemp, ¼ and ½-lb. Balls..... 13@14c* | | |
| *American 3 Ply Hemp, 1-lb. Balls.. 13@14c* | | |
| *India 3-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine).....9c* | | |
| *India 3-Ply Hemp, 1-lb. Balls.... 8c* | | |
| *2, 3, 4 and 5-Ply Jute, ½-lb. Balls,.. 2½@10c* | | |
| *Mason Line, Linen ½-lb. Balls...15c* | | |
| *No. 264 Mattress, ¼ and ½-lb. Balls.37c* | | |
| *Wool, 3 to 6 ply.....5½c* | | |

# Vises—

*Solid Box.....50@50&10%*

## Parallel—

Athol Machine Co.:
Simpson's Adjustable..... .....40%
Standard..... .....40%
Amateur..... .....25%
Bonney's.....40%
Columbian Hdw. Co .....40%
Fisher & Norris Double Screw....15&10%
Hollands':
Machinists'.....40%
Keystone.....65&5%
Lewis Tool Co.....20@30%
Massey's Perfect.....15@20%
Massey's:
Clincher.....30@40%
Combination, Quick Adj.....40%
Woodworker's.....15@20%
Morrill's .....20%
Miller's Falls.....50&10&10%
Parker's:
Victor.....20@25%
Regulars.....20@25%
Vulcan's.....40@45%
Combination Pipe.....55@60%
Prentiss.....20@25%
Sargent's.....40%
Snedliker's X. L.....30@35%
Stephens'.....20@25%

## Saw Filers—

Bonney's, No. 1, $13; No. 3, $16 .....50%
Diston's D 3 Clamp and Guide, ₱ doz. $30.....25%
Reading.....60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....45&50%

## Miscellaneous—

Bignall & Keeler Combination Pipe Vise.....60%
Parker's Combination Pipe:
87 Series.....60%
187 Series..... .....60&5%
No. 870.....40%

# Wads—Price Per M.

| | |
|---|---|
| *B. E., 11 up.....* | *60c* |
| *B. E., 9 and 10.....* | *70c* |
| *B. E., 8.....* | *80c* |
| *B. E., 7.....* | *80c* |
| *P. E., 11 up.....* | *1.00* |
| *P. E., 9 and 10.....* | *1.25* |
| *P. E., 8 .....* | *1.50* |
| *P. E., 7.....* | *1.50* |
| *Ely's B. E., 11 and larger..* | *$1.70@1.75* |
| *Ely's P. E., 12 to 20 .....* | *$3.00@3.85* |

*Dis. 50&5%*

## Wagon Jacks—

See *Jacks, Wagon.*

## Ware, Hollow—

Aluminum—
S. S. & Co. Reduced List..... .....40%

### Cast Iron, Hollow—

*Stove Hollow Ware:*
*Ground.....65%*
*Unground.....70%*
*White Enameled Ware:*
*Maslin Kettles.....75¢10¢5@80%*
*Covered Ware:*
*Tinned and Turned..... ..... 40¢10@10&10¢5%*
*Enameled and Plain..50@50&10¢5%*
See also *Pots, Glue.*

### Enameled—

Agate Nickel Steel Ware, list Nov. 1, '01.....50&20%
Iron Clad Ware.....70&10%
Never Break Enameled....50&5@50&10%

### Tea Kettles—

*Galvanized Tea Kettles:*

| *Inch.....* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|
| *Each.....* | *45c* | *50c* | *55c* | *65c* |

### Steel Hollow Ware.

Avery Spiders & Griddles .....65&65&5%
Avery Kettles.....60%
Porcelained.....50&5@50&10%
Never Break Spiders and Griddles..... 65&5%
Never Break Kettles..... 60%
Solid Steel Spiders & Griddles. ....65&5%
Solid Steel Kettles.....60%
Solid Steel Ware, Enameled ..... 50&5%

### Washboards—

Solid Zinc: ₱ doz
Crescent, family size, bent frame..$3.00
Red Star, family size, stationary protector..... .....$3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector.....$2.85
Cable Cross, family size, stationary protector .....$2.90
Single Zinc Surface:
Naiad, family size, open back perforated.....$2.40
Saginaw Globe, protector, family size, ventilated back .....$2.85

Brass Surface:
Brass King, Single Surface, open back ..... $3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.00

### Washers—
#### Leather, Axle—
*Solid*.....85&10&10&10&10%
*Patent*.....85&10&10&20%
*Coil:* ⅜ 1 1¼ 1¼ Inch.
10c 11c 14c 18c per 100

#### Iron or Steel—
*Size bolt*.... 5-16 ⅜ ½ ⅝ ¾
*Washers*....$5.10 4.20 2.90 2.10 2.50
*In lots less than one keg add ¼c per lb., 5-lb. boxes add ½c to list.*

#### Cast Washers—
*Over ½ inch, barrel lots, per lb.*.... 1¼@1¾c

### Washer Cutters—
See *Cutters, Washer.*

### Washing Machines—
See *Machines, Washing.*

### Water Coolers—
See *Coolers, Water.*

### Wedges—
*Oil Finish*.....*lb.* 2.90@3.10c

### Weights, Sash—
*Per ton, f.o.b. factory*....$21.00@22.00

*Some Foundries make price $1@$2 lower.*

### Well Buckets, Galvanized
See *Pails, Galvanized.*

### Wheels Well—
*8-in.*, $1.45@1.65; *10-in.*, $1.75@2.00; *12-in.*, $2.35@2.50; *14-in.*, $3.50@3.75

### Wire and Wire Goods—
*Bright and Annealed:*
*6 to 9*.....72½&5@72½&10%
*10 to 18*.....72½&10@72½&10&5%
*19 to 26*.....75&10&2½@75&10&7½%
*27 to 36*.....75&10&7½@80&2½%
*Galvanized:*
*6 to 18*.....70@70&5%
*19 to 26*.....72½&5@72½&10%
*27 to 36*.....72½&10@72½&10&5%
*Coppered:*
*6 to 9*.....70&5@70&10%
*10 to 18*.....70&10@70&10&5%
*19 to 26*.....75&7½@75&10&2½%
*27 to 36*.....75&10@75&10&5%
*Tinned:*
*6 to 14*.....75@75&7½%
*15 to 18*.....72½&5@75%
*19 to 26*.....70&5@70&5&5%
*27 to 36*.....70@70&5%
*Annealed Wire on Spools*..70&5@70 &10%
*Brass and Copper Wire on Spools*.. 60&5@50&10%
*Brass, list Feb. 26, '96*.....25%
*Copper, list Feb. 26, '96*.....15%
*Cast Steel Wire*.....50%
*Stubs' Steel Wire*.....$6.00 to $. 40%
Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

### Bright Wire Goods—
*List April 1, 1901*.....85&10%

### Wire Cloth and Netting—
*Galvanized Wire Netting*..80&20@..%
*Painted Screen Cloth per 100 ft..$1.00*
*Light Hardware Grade:*
*2-18 Mesh, Plain (8c. list) sq. ft.*.. 1⅛@1¼c
*2-18 Mesh, Galv. (8c. list) sq. ft.*... 2⅛@2¾c

### Wire, Barb—See *Trade Report.*

### Wire Rope—See *Rope, Wire.*

### Wrenches—
*Agricultural*.....70&10@75&10%
*Case lots*.....75&10%
Acme.....60&10%
Alligator.....70%
Baxter's S.....60&10%
Bull Dog.....70%
Bemis & Call's:
Adjustable S.....35&5%
Adjustable S Pipe.....40%
Brigg's Pattern.....30&10%
Combination Black.....40&5%
Combination Bright.....40%
Cylinder or Gas Pipe.....55%
Extra Heavy.....45%
Merrick's Pattern.....50%
No. 3 Pipe, Bright.....55%
Bindley Automatic.....30%
Boardman's.....33⅓%
Coes' Genuine.....40&10&5&5%
Coes' "Mechanics'.....40&10&10&5&5%
Donohue's Engineer.....40&10%
Eagle.....50&10%
Elgin Wrenches.....40%
Elgin Monkey Wrench Pipe Jaws..33⅓%
Gem Pocket.....30%
Hercules.....70%
Knife Handle, Machinists' (W. & B.):
Case lots.....50&10%
Less than case lots.....50&5%
Improved Pipe (W & B.).....6%
Solid Handles, P.S. & W.....50&50&10%
Stillson.....65%
Triumph.....60&10%

### Wrought Goods—
*Staples, Hooks, &c., list March 17 '92*.....90@90&10%

### Yokes Neck—
Covert Saddlery Works, Trimmed.60&5%
Covert Saddlery Works, Neck Yoke Centers.....70%

### Yokes, Ox, and Ox Bows—
Fort Madison's Farmers & Freighters'.. list net

### Zinc—
*Sheet*.....*lb* 6¼c@6¾c

## PAINTS, OILS AND COLORS—Wholesale Prices.

### White Lead, Zinc, &c.
Lead, English white, in Oil..... @ 9¼
Lead, American White, in Oil:
Lots of 500 ℔ or over..... @ 6¼
Lots less than 500 ℔..... @ 7
Lead, White, in oil, 25 ℔ tin pails, add to keg price..... @ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price..... @ 1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price..... @ 1½
Lead White, Dry in bbls..... 5¾@ 6
Lead, American. Terms: On lots of 500 lbs. and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.
Zinc, American, dry..... ℔ ℔ 4½@ 4¾
Zinc, Paris, Red Seal, dry..... @ 8½
Zinc, Paris, Green Seal, dry..... @ 9¼
Zinc, Antwerp Red Seal, dry..... @ 6¼
Zinc, Antwerp, Green Seal, dry..... @ 8
Zinc, V. M. French, in Poppy Oil, Green Seal:
Lots of 1 ton and over.....12 @12½
Lots of less than 1 ton.....12¼@12¾
Zinc, V. M French, in Poppy Oil, Red Seal:
Lots of 1 ton and over.....10¾@11¼
Lots of less than 1 ton.....11@11¾
DISCOUNTS.—V. M. French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

### Dry Colors.
Black, Carbon.....℔ ℔ 8 @20
Black, Drop, Amer..... 4 @ 7
Black, Drop, Eng..... 7 @11
Black, Ivory..... 12 @21
Lamp, Com..... 4½@ 6
Blue, Celestial.....℔ ℔ 4 @ 6
Blue, Chinese.....30 @35
Blue, Prussian.....28 @34
Blue, Ultramarine..... 4 @20
Brown, Spanish..... ½@ 1
Brown, Vandyke, Amer..... 1¾@ 2½
Brown, Vandyke, Foreign..... 2½@ 3½
Carmine, No. 40.....℔ ℔2.05@2.75
Green, Chrome, ordinary..... 5 @ 6½
Green, Chrome, pure.....16 @29
Lead, red, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over..... @ 6
Lots less than 500 ℔..... @ 6½
Litharge, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over..... @ 6
Lots less than 500 ℔..... @ 6½
Ocher, French Washed..... 1¾@ 1⅞
Ocher, Dutch Washed..... 4¾@ 5
Ocher, American....℔ ton$10.00@15.00
Orange Mineral, English..℔ ℔ 8½@11½
Orange Mineral, French.....11 3-16@11½
Orange Mineral, German..... 8½@10½
Orange Mineral, American..... 8 @ 8½
Red, Indian, English..... 4½@ 8½
Red, Indian, American..... 3 @ 3¼
Red, Turkey, English..... 4 @ 6
Red, Tuscan, English..... 7 @10
Red, Venetian, Amer..℔ 100 ℔. 80@1.75
Red Venetian, English.℔ 100 ℔ 1.80@3.00
Sienna, Italian, Burnt and Powdered.....℔ ℔ 3½@ 7½
Sienna, Ital., Raw, Powd..... 3½@ 7½
Sienna, American, Raw..... 1½@ 2
Sienna, American, Burnt and Powdered.....℔ ℔ 1½@ 2
Talc, French.....℔ 100 ℔ $1.25@1.50
Talc, American..... .90 @1.10
Terra Alba, French, ℔ 100 ℔ . 95 @1.00
Terra Alba, English..... .95 @1.00
Terra Alba, American No. 1....65 @85
Terra Alba, American No. 2....45 @50
Umber, Turkey, Bnt. & Pow.℔ ℔ 2½@ 3½
Umber, Turkey, Raw & Powd. 2½@ 3½
Umber, Bnt. Amer..... 1½@ 2
Umber, Raw, Amer..... 1½@ 2
Yellow, Chrome.....10½@25
Vermilion, American Lead.....10 @10
Vermilion, Quicksilver, bulk.... @70
Vermilion, Quicksilver, bags.... @71
Vermilion, English, Import.... 80 @95
Vermilion, Chinese.... .$1.05@1.20

### Colors in Oil.
Black, Lampblack..... 12 @14
Blue, Chinese..... 36 @40
Blue, Prussian..... 32 @35
Blue, Ultramarine..... 13 @16
Brown, Vandyke..... 9½@13
Green, Chrome..... 10 @12
Green, Paris..... @24
Sienna, Raw..... 10 @13
Sienna, Burnt..... 10 @13
Umber, Raw..... 9½@12
Umber, Burnt..... 9½@12

### Miscellaneous.
Barytes, Foreign, ℔ ton....$19.00@21.00
Barytes, Amer. floated..... 19.00@20.00
Barytes, Crude, No. 1..... 9.00@10.00
Chalk, in bulk.....℔ ton 2.50@ 2.60
Chalk, in bbls.....℔ 100 ℔ ..@ 35
China Clay, English..℔ ton 12.00@17.50
Cobalt, Oxide.....℔ 100 ℔ 2.20@ 2.50
Whiting, Common ℔ 100 ℔ .40@ .60
Whiting, Gilders..... .45½@ .65
Whiting, extra Gilders'.... .55@ .68

### Putty.
In bladders.....$2.25
In bulk..... 1.25
In cans 1 ℔ to 5 ℔..... 3.25
In cans 12 ℔ to 25 ℔..... 2.25

### Spirits Turpentine.
In Southern bbls.....37¾@38½¢
In machine bbls.....38½@ 39¼¢

### Glue.
Cabinet.....11½@16
Extra White.....18 @23
French.....12 @40
Irish.....13½@16
Low Grade.....℔ ℔ 9 @12
Medium White..... .14½@16½

### Animal, Fish and Vegetable Oils.
Linseed, City, raw.....℔ gal..52 @58
Linseed, City, boiled..... 53 @58
Linseed, State and West'n, raw.51 @54
Linseed, raw Calcutta see l.... @85
Lard, Prime..... 80 @81
Lard, Extra No. 1..... .51 @55
Lard, No. 1..... .47 @48
Cotton-seed, Crude..... @ ..
Cotton-seed, Summer Yellow, prime..... 41 @41½
Cotton-seed Summer Yellow, off grades..... .40 @40½
Sperm, Crude..... @ ..
Sperm, Natural Spring..... 60 @61
Sperm, Bleached Spring..... @ ..
Sperm, Natural Winter..... 65 @67
Sperm, Bleached Winter..... 68 @70
Tallow, Prime..... 62 @64
Whale, Crude..... @ ..
Whale, Natural Winter..... 46 @47
Whale, Bleached Winter..... 48 @49
Menhaden, Crude, Sound..... @ ..
Menhaden, Light Strained..... 31 @32
Menhaden, Bleached Winter..... @35
Menhaden, Ex Bleached Winter 36 @37
Cocoanut, Ceylon..... 7¼@ 8
Cocoanut, Cochin..... 7¾@ 8¼
Cod, Domestic..... 33 @34
Cod, Newfoundland..... 35 @40
Red Elaine..... @42
Red Saponified.....℔ ℔ 6½@ 6¾
Olive, Italian, bbls..... 59 @ 62
Neatsfoot, prime..... 53 @ 54
Palm, prime, Lagos.....℔ ℔ 5½@ 5¾

### Mineral Oils.
Black, 20 gravity, 25@30 cold test.....℔ gal. 9¼@ 10¼
Black, 29 gravity, 15 cold test. 10½@ 11½
Black, summer..... 9¼@ 9¾
Cylinder, light filtered..... 14¾@17¾
Cylinder, dark filtered..... 11½@15¾
Paraffine, 903-907 gravity..... 12½@12¾
Paraffine, 903 gravity.. ..... 11¾@11¾
Paraffine, 883 gravity..... 9½@10
Paraffine, red, No. 1..... 12¾@12¾
In small lots ¼¢ advance.

# THE IRON AGE.

*The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.*

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### Sieves and Sifters—

*Hunter's Imitation, gro. $11.00@11.50*
Buffalo Metallic Blued, S. S. & Co., ₱ gr.:

| 14&16 | 16&18 | 18&20 |
|---|---|---|
| $12.90 | $13.80 | $15.00 |

F. J. Meyers' Mfg. Co.:
Eclipse.....₱ gr. $11.00
Electric Light.....₱ gr. $11.00
Hunter's Genuine.....₱ gr. $12.50
No Name, Hunter's.....₱ gr. $11.00
Standard.....₱ gr. $11.00
Shaker (Barler's Pat.) Flour Sifters.,
₱ doz., $2.00.....90%

### Sieves, Tin Rim—

*Per dozen*

| Mesh | 14 | 16 | 18 | 20 |
|---|---|---|---|---|
| Black, full size | $0 95 | .98 | 1.00 | 1.10 |
| Plated, full size | $1.05 | 1.08 | 1.10 | 1.20 |
| Black, scant | $0.78 | .80 | .83 | |

### Sieves, Wooden Rim—

*Nested, 10, 11 and 12 Inch.*
*Mesh 18, Nested, doz.....$0.65@0.75*
*Mesh 20, Nested, doz..... .75@ .85*
*Mesh 24, Nested, doz..... .90@1.00*

### Sinks—

#### Cast Iron—

*Standard list.....65&10@70..%*
NOTE.—*There is not entire uniformity lists used by jobbers.*

#### Wrought Steel—

New Era, Galv'd and Enameled...70&5%
New Era, Painted.....50&10%
L. & G. Mfg. Co., Galvanized.....50%
L. & G. Mfg. Co. Enameled.....50%

### Skeins, Wagon—

*Cast Iron.....70&10@75%*
*Malleable Iron.....40&10@50%*
*Steel.....40@40&10%*

### Slates—

*Factory Shipments.*
*"D" Slates..... 50&10&10&10%*
*Unexcelled, etc., Noiseless Slates..60 & 8 tens %*
*Victoria, etc., Noiseless Slates..60& 7 tens &5%*
*Wire Bound.....50&10&5%*
*Web Hinge.....5%*

### Slaw Cutters—See *Cutters.*

### Slicers, Vegetable—

Sterling $2.00.....33⅓%

### Snaps, Harness—

*German.....40@40&10%*
Covert Mfg. Co.:
Derby.....35&2%
High Grade.....45&2%
Jockey.....40&2%
Trojan.....45&2%
Yankee.....35&2%
Yankee, Roller.....30&2%
Covert's Saddlery Works:
Crown.....60%
German.....60%
Model.....60%
Triumph.....60%
W. & E. T. Fitch Co.:
Bristol.....40&10%
Empire.....50&5%
German.....40%
National.....50&5%
Perfect.....40%
Clipper.....50&5%
Champion.....40%
Security.....40%
Victor.....60&5%
Oneida Community:
Solid Steel.....65@65& 0%
Solid Swivel.....65&10@65&10&10%
Sargent's Patent Guarded.....66⅔&10%

### Snaths—

*Scythe.....50@50&10%*

### Snips, Tinners'—See *Shears*

### Soldering Irons—

See *Irons, Soldering.*

### Spoke Trimmers—

See *Trimmers, Spoke.*

### Spoons and Forks—

#### Silver Plated—

*Good Quality.....50&10@60&10&5%*
*Cheap.....60@60&10%*
International Silver Co.:
1847 Rogers Bros. and Rogers & Hamilton.....40&10%
Rogers & Bro., William Rogers Eagle Brand.....50&10%
Anchor, Rogers Brand.....60%
Wm. Rogers & Son.....60&10%
Simeon L. & Geo. H. Rogers Co.:
Silver Plated Flat Ware.....60%
No. 77 Silver Plated Ware.....60&1%

#### Miscellaneous—

*German Silver.....60&10@60&10&10%*
Simeon L. & Geo. H. Rogers Co.:
German or Nickel Silver, Special list 1 & 10%

#### Tinned Iron—

*Teas.....per gro. 45@5.c*
*Tables.....per gro. 90c@$1.00*

### Springs—

#### Door—

Gem (Coil).....20%
Star (Coil).....30%
Torrey's Red, 30 in....₱ doz. $1.10@1.25
Victor (Coil).....50&10&10%

### Carriage, Wagon, &c.

*1¼ in. and Wider:*
*Black or ⅛ Bright, lb.....4¼c*
*Bright, lb.....5¼c*
*Painted Seat Springs:*
*1½ x2x26 and smaller, per pr 48@53c*
*1½ x 2 x 28 per pr..... 56@61c*
*1½ x 3 x 28 and narrower, per pr. 75@80c*
Cliff's Springs:
Bolster.....40%
Seat.....per pair 50¢
Pole..per pair, ⅝ in. $1 10; ¾ in. $1.25

### Sprinklers, Lawn—

Enterprise.....25@20%
Philadelphia No. 1, ₱ doz. $12; No. 2, $15; No. 3, $24.....30%

### Squares—

*Nickel plated....} List Jan. 5, 1900*
*Steel and Iron...}.....70&10@75%*
*Rosewood Hdl Try Square and T-Bevels.....60&10&10@70%*
*Iron Hdl. Try Squares and T-Bevels. 40&10@40&10&10%*
Disston's Try Sq. and T-Bevels.....60&10%
Winterbottom's Try and Miter.....50&10%

### Squeezers—

#### Lemon—

*Wood, Common, gro., No. 0, $5.25 @$5.50; No. 1, $6.25@$6.50.*
*Wood, Porcelain Lined:*
*Cheap.....doz. $2.00@2.75*
*Good Grade.....doz. $3.00@3.50*
*Tinned Iron.....doz. $0.75@1.25*
*Iron, Porcelain Lined doz. $2.90@3.25*
Jennings' Star.....₱ doz. $1.85@1.90

### Staples—

*Barbed Blind.....lb. 6@7¼c*
*Electricians', Association list..... 80&10&10%*
*Fence Staples, same price as Barbed Wire. See Trade Report.*
*Poultry Netting, Staples....per lb.. 5¼@5¼c*
Grand Crossing Tack Co.'s list....80&10%

### Steels, Butchers'—

Dick's.....30%
Foster Bros'.....30%
Hartzell Cutlery Co.....60&5%
C. & A. Hoffmann's.....40%

### Steelyards.....25@25&10%

### Stocks and Dies—

*Blacksmiths'.....40@40&10%*
Gardner Die Stocks No. 1.....50%
Gardner Die Stocks, larger sizes.....40%
Green River.....25%
Lightning Screw Plate.....25%
Little Giant.....25%
Reece's New Screw Plates.....25@30%
Curtis Reversible Ratchet Die Stock.25%

### Stone—

#### Scythe Stones—

Chicago Wheel & Mfg. Co:
Gem Corundum, 10 inch, $3.00 per gro., 12 inch, $10.80
Pike Mfg. Co. 1901 list:

| | ₱ gro. |
|---|---|
| Black Diamond S. S. | $12.00 |
| Lamoille S. S. | 11.00 |
| White Mountain S. S. | 9.00 |
| Green Mountain S. S. | 6.00 |
| Extra Indian Pond S. S. | 7.50 |
| No. 1 Indian Pond S. S. | 7.00 |
| No. 2 Indian Pond S. S. | 4.50 |
| Leader Red End S. S. | 4.50 |
| Balance of 1901 list 33⅓% | |

#### Oil Stones, &c.

Chicago Wheel & Mfg. Co., 1901 list:
Gem Corundum Oil, Double Grit.....50%
Gem Corundum Axe, Single or Double Grit.....55%
Gem Corundum Slips.....55%
Gem Corundum Razor Hones.....50%
Pike Mfg. Co. 1901 list:

| | ₱ lb |
|---|---|
| Arkansas Stone, No. 1, 3 to 5 in. | $2.80 |
| Arkansas Stone, No. 1, 5½ to 8 in. | 3.50 |
| Arkansas Slips No. 1 | 4.00 |
| Lily White Washita 4 to 8 in | 60¢ |
| Rosy Red Washita, 4 to 8 in | 60¢ |
| Washita Stone, Extra, 4 to 8 in. | 50¢ |
| Washita Stone, No. 1, 4 to 8 in. | 40¢ |
| Washita Stone, No. 2, 4 to 8 in. | 30¢ |
| Lily White Slips | 90¢ |
| Rosy Red Slips | 90¢ |
| Washita Slips, Extra | 80¢ |
| Washita Slips, No. 1 | 70¢ |
| India Oil Stones (entire list) | 25% |
| Hindostan No. 1, Regular | ₱ lb 8¢ |
| Hindostan No. 1 Small | ₱ lb 10¢ |
| Axe Stones (all kinds) | 33⅓% |
| Turkey Oil Stones, ex. 5 ins. in. | ₱ doz. 80¢ |
| Queer Creek Stones, 4 to 8 in. | 20¢ |
| Queer Creek Slips | 90¢ |
| Sand Stone | 5¢ 40¢ |
| Belgian, German and Swaty Razor Hones | 40% |
| Natural Grit Carving Knife Hones, | ₱ doz. $3.00 |
| Quick Edge Pocket Knife Hones, | ₱ doz. $2.00 |
| Mounted Kitchen Sand Stone, | ₱ doz. $1.20 |

Tanite Mills:
Emery Oil, ₱ doz. $5.00.....50@60%

### Stoners—

#### Cherry—

Enterprise.....25@30%

### Stops, Bench—

Millers Falls.....15&10%
Morrill's...₱ doz., No. 1, $10.00..50&20%
Morrill's, No. 2, $11.00.....50&10%

### Stops, Window—

Ives' Patent.....25&5%

### Stove Boards—

See *Boards, Stove.*

### Stove Polish—See *Polish, Stove.*

### Strainers, Pump—

Diamond Joe Pump Strainers..per doz. 75¢

### Straps, Box—

Cary's Universal case lots.....20&10%

### Stretchers, Carpet—

*Cast Iron, Steel Points...doz. 55@65c*
*Socket.....doz. $1.75*

### Strops, Razor—

Smith & Hemenway Co.....70%

### Stuffers, Sausage—

Enterprise Mfg. Co.....25@25&7½%
National Specialty Mfg. Co., list Jan. 1, '97.....30%

## Tacks Brads, &c.—

*List Jan. 15, '99.*
*Carpet Tacks, American 90@25@....%*
*American Cut Tacks....90@20@....%*
*Swedes Iron Tacks.....90@30@....%*
*Swedes Upholsterers' Tacks..... 90@40@....%*
*Gimp Tacks.....90@70@....%*
*Lace Tacks.....90@40@....%*
*Trimmers' Tacks.....90@25@....%*
*Looking Glass Tacks.....70@10%*
*Bill Posters' and Railroad Tack.... 90@40@....%*
*Hungarian Nails.....80@15%*
*Common and Patent Brads....80@10%*
*Trunk and Clout Nails.....80@5%*

NOTE.—*The above prices are for straight Weights.* An extra 5% is given Star Weights** and an extra 10@2½ on Standard Weights.****

### Miscellaneous—

*Double Point Tacks.....90@6 or 7 tens*
*Steel Wire Brads, R. & E. Mfg. Co.'s list.....50@10@60%*
See also *Nails, Wire.*

### Tanks, Oil—

Emerald, S. S. & Co.....30-gal. $3.20
Emerald, S. S. & Co.....60-gal., $4.00
Queen City S. S. & Co., 30-gal.....$3.50
Queen City S. S. & Co., 60-gal.....$4.25

### Tapes, Measuring—

*American Asses' Skin.....40@10@50%*
*Patent Leather.....25@25@5%*
*Steel.....40@40@5%*
*Chesterman's.....25@25@5%*
Eddy's Steel.....40@40@5%
Eddy's Metallic.....33⅓@33⅓@5%
Keuffel & Esser Co., Steel and Metallic, Lower list, 1899.....35%
Lufkin's Steel.....33⅓@35%
Lufkin's Metallic.....30@30@5%

### Teeth Harrow—

*Steel Harrow Teeth, plain or headed, bas per lb.....2¼c*

### Thermometers—

*Tin Case.....80@10@80@10@5%*

### Ties, Bale—Steel.

*Standard Wire.....50@10@5%*

### Ties, Wall—

Cleveland Wire Spring Co.:
Galv. Steel 5-32 x 6½ in. ₱ 1000..$10.00
Galv. Steel 5-32 x 8½ in. ₱ 1000..$11.00
Galv. Steel 5-32 x 11½ in ₱ 000 $12.00
Galv. Steel 5-32 x 15½ in. ₱ 1000 $14.00

### Tinners' Shears, &c.—

See *Shears, Tinners', &c.*

### Tinware—

Stamped, Japanned and Pieced, sold very generally at net prices.

### Tire Benders, Upsetters, &c.—See *Benders and Upsetters, Tire*

### Tobacco Cutters—

See *Cutters, Tobacco.*

### Tools—

#### Coopers'—

L. & I. J. White.....20@20&5%

#### Saw—

Atkins' Cross Cut Saw Tools.....40%
Simonds' Improved.....33⅓%
Simonds' Crescent.....25%

#### Ship—

L. & I. J. White.....25%

### Transom Lifters—

See *Lifters, Transom.*

### Traps—Fly—

*Balloon, Globe or Acme..... doz. $1.15@1.25; gro. $10.50@11.00*
*Harper, Champion or Paragon ... doz. $1.25@1.40; gro. $12.00@13 50*

#### Game—

*Oneida Pattern.....75&10&5@80&5%*
Newhouse.....45@45&5%
Hawley & Norton.....65&5@65&10%
Victor (Oneida Pattern).....75@75&5%
Star (Blake Pattern).....60&5@60&10%

#### Mouse and Rat—

*Mouse, Wood, Choker, doz. holes.... 8½@9c*
*Mouse, Round or Square Wire..... doz. $0.85@1.00*
American Pattern French Rat and Mouse Traps—
No. 1, Detroit Marty Pattern, ₱ doz. $4.50; in ½ gro. lots, ₱ doz.....$4.00
No. 2, Detroit Marty Pattern, ₱ doz. $3.25; in ½ gro. lots, ₱ doz.....$3.00
Detroit Marty Pattern Mouse, ₱ doz. $2.00; in ½ gro. lots, ₱ doz.....$1.75
Diamond Joe Mouse Traps....per doz. 60¢
Diamond Joe Rat Traps.....per doz. $1.00
Marty French Rat and Mouse Traps (Genuine):
No. 1, Rat, Each $1 12½;..₱ doz. $12.00
No. 3, Rat, ₱ doz. $6.00; case of 50 $5.25 doz.
No. 3½, Rat, ₱ doz. $4.75; case of 72 $4.25 doz.
No. 4, Mouse, ₱ doz. $3.50; case of 72 $3.75 doz.
No. 5, Mouse, ₱ doz. $2.75; case of 150 $2.25
Schuyler's Rat Killer, No. 1, ₱ gr. $30.00; No. 2, ₱ gr. $20.00; Mouse, No. 3, $18.00.....50%

#### Target—

Markle's, each.....$5.50

### Trimmers, Spoke—

Bonney's Nos. 1 and 2.....40%

### Trowels—

Diston Brick and Pointing.....30%
Diston Plastering.....25%
Diston "Standard Brand" and Garden Trowels.....40%
Never-Break Steel Garden Trowels. gro. $7.00
Peace's Plastering.....30%
Rose Brick and Plastering.....25&5%
Woodrough & McParlin, Plastering.....25%

### Trucks, Warehouse, &c.—

B. & L. Block Co.'s list.....50%
Daisy Stove Trucks, Improved pattern ₱ doz. $18.50
Model Stove Trucks.....₱ doz. $18.50

### Tubs, Wash—

| | No. 1 | 2 | 3 |
|---|---|---|---|
| *Galvanized, per doz.* | *$5.00* | *5 50* | *6.00* |

Galvanized Wash Tubs (S. S. & Co.):

| No. | 1 | 2 | 3 | 10 | 20 | 30 |
|---|---|---|---|---|---|---|
| Per doz. | $5 25 | 6.00 | 6.75 | 6.50 | 7 25 | 8.00 |

### Twine—

#### Miscellaneous—

| *Flax Twine—* | *BC* | *B.* |
|---|---|---|
| *No. 9, ¼ and ½-lb. Balls..* | *22c* | *24c* |
| *No. 12, ¼ and ½-lb. balls..* | *18c* | *20c* |
| *No. 18, ¼ and ½-lb. Balls..* | *16c* | *18c* |
| *No. 24, ¼ and ½-lb. Balls* | *15½c* | *17½c* |
| *No. 36, ¼ and ½-lb. Balls..* | *15c* | *17c* |
| *Chalk Line, Cotton, ¼-lb Balls....* | | *22@22½c* |
| *Cotton Mops, 6, 9, 12 and 15 lb. to doz.....* | | *7@8c* |
| *Cotton Wrapping, 5 Balls to lb.... according to quality. ..10¼c@17c* | | |
| *American 2-Ply Hemp, ¼ and ½-lb. Balls.....* | | *13@14c* |
| *American 3 Ply Hemp, 1-lb. Balls.. 13@14c* | | |
| *India 2-Ply Hemp, ¼ and ½-lb. Balls (Spring Twine).....* | | *9c* |
| *India 3-Ply Hemp, 1-lb. Balls.....* | | *9c* |
| *India 3-Ply Hemp, 1½-lb. Balls.... 8c* | | |
| *2, 3, 4 and 5-Ply Jute, ½-lb. Balls,.. 9½@10c* | | |
| *Mason Line, Linen ½-lb. Balls...45c* | | |
| *No. 2½ Mattress, ¼ and ½-lb. Balls 37c* | | |
| *Wool, 3 to 6 ply.....* | | *5½c* |

### Vises—

*Solid Box.....50@50&10%*

#### Parallel—

Athol Machine Co.:
Simpson's Adjustable.....40%
Standard.....40%
Amateur.....25%
Bonney's.....40%
Columbian Hdw. Co.....40%
Fisher & Norris Double Screw....15&10%
Hollands':
Machinists'.....40%
Keystone.....65&5%
Lewis Tool Co.....20@30%
Massey's Perfect.....15@20%
Massey's:
Clincher.....80@40%
Combination, Quick Adj.....40%
Woodworker's.....15@20%
Merrill's.....20%
Miller's Falls.....50&10&10%
Parker's:
Victor.....20@25%
Regulars.....20@25%
Vulcan's.....40@45%
Combination Pipe.....55@60%
Prentiss.....20@25%
Sargent's.....40%
Snediker's X. L.....20@25%
Stephens'.....20@25%

### Saw Filers—

Bonney's, No. 1, $13; No. 3, $16.....50%
Disston's D 3 Clamp and Guide, ₱ doz. $30.....25%
Reading.....60%
Wentworth's Rubber Jaw, Nos. 1, 2 and 3.....45&50%

#### Miscellaneous—

Bignall & Keeler Combination Pipe Vise.....60%
Parker's Combination Pipe:
87 Series.....60%
187 Serels.....60&5%
No. 870.....40%

## Wads—Price Per M.

| | |
|---|---|
| *B. E., 11 up* | *60c* |
| *B. E., 9 and 10* | *70c* |
| *B. E., 8* | *80c* |
| *B. E., 7* | *80c* |
| *P. E., 11 up* | *$1.00* |
| *P. E., 9 and 10* | *1.25* |
| *P. E., 8* | *1.50* |
| *P. E., 7* | *1.50* |
| *Ely's B E., 11 and larger* | *$1.70@1.75* |
| *Ely's P. E., 12 to 20* | *$3.00@3.25* |

*Dis. 50&10%*

### Wagon Jacks—

See *Jacks, Wagon.*

### Ware, Hollow—

#### Aluminum—

S. S. & Co. Reduced List.....40%

#### Cast Iron, Hollow—

*Stove Hollow Ware:*
*Ground.....65%*
*Unground.....70%*
*White Enameled Ware:*
*Maslin Kettles.....75&10&5@80%*
*Covered Ware:*
*Tinned and Turned..... 40&10@40&10&5%*
*Enameled and Plain.50@50&10&5%*
See also *Pots, Glue.*

#### Enameled—

Agate Nickel Steel Ware, list Nov. 1, '01.....50&20%
Iron Clad Ware.....70&10%
Never Break Enameled....50&5@50&10%

#### Tea Kettles—

*Galvanized Tea Kettles:*

| *Inch* | *6* | *7* | *8* | *9* |
|---|---|---|---|---|
| *Each* | *45c* | *50c* | *55c* | *65c* |

#### Steel Hollow Ware.

Avery Spiders & Griddles.....65@65&5%
Avery Kettles.....60%
Porcelained.....50&5@50&10%
Never Break Spiders and Griddles..... 65&5%
Never Break Kettles.....60%
Solid Steel Spiders & Griddles.....65&5%
Solid Steel Kettles.....60%
Solid Steel Ware, Enameled.....50&5%

### Washboards—

Solid Zinc: ₱ doz
Crescent, family size, bent frame. $3.00
Red Star, family size, stationary protector.....$3.00
Double Zinc Surface:
Saginaw Globe, family size, stationary protector.....$2.85
Cable Cross, family size, stationary protector.....$2.90
Single Zinc Surface:
Salad, family size, open back perforated.....$3.40
Saginaw Globe, protector, family size, ventilated back.....$2.95

Brass Surface:
Brass King, Single Surface, open back.....$3.00
Nickel Plate Surface:
No. 1001 Nickel Plate, Single Surface $3.00

**Washers—**
**Leather, Axle—**
*Solid*.....85c@10c@10@85c@10c@10c@10%
*Patent*.....85c@10@85c@20%
*Coil:* ⅜ 1 1¼ 1¾ *Inch.*
10c 11c 14c 18c *per 100*

**Iron or Steel—**
*Size bolt*.... 5-16 ⅜ ½ ⅝ ¾
*Washers*....$5.10 4.20 2.00 2.10 2.50
*In lots less than one keg add ¼c per lb., 5-lb. boxes add ½c to list.*

**Cast Washers—**
*Over ½ inch, barrel lots, per lb.*.....1¼@1¾c

**Washer Cutters—**
See *Cutters, Washer.*

**Washing Machines—**
See *Machines, Washing.*

**Water Coolers—**
See *Coolers, Water.*

**Wedges—**
*Oil Finish*.....*lb.* 2.90@3.10c

**Weights, Sash—**
*Per ton, f.o.b. factory*....$21.00@22.00

*Some Foundries make price $1@$2 lower.*

**Well Buckets, Galvanized**
See *Pails, Galvanized.*

**Wheels Well—**
*8-in., $1.45@1.65; 10-in., $1.75@2.00; 12-in., $2.35@2.50; 14-in., $3.50@3.75*

**Wire and Wire Goods—**
*Bright and Annealed:*
*6 to 9*.....72½c@5@72½@10%
*10 to 13*.....72½@10@72½@10@5%
*14 to 26*.....75@10@71½@10@7½%
*27 to 36*.....75@10@7½@30@2½%
*Galvanized:*
*6 to 18*.....70@70@5%
*19 to 26*.....72½@5@72½@10%
*27 to 36*.....72½@10@72½@10@5%
*Coppered:*
*6 to 9*.....70@5@70@10%
*10 to 13*.....70@10@70@10@5%
*14 to 26*.....75@7½@75@10@2½%
*27 to 36*.....75@10@75@10@5%
*Tinned:*
*6 to 14*.....75@75@7½%
*15 to 18*.....72½@5@75%
*19 to 26*.....70@5@70@5@5%
*27 to 36*.....70@70@5%
*Annealed Wire on Spools*..70@5@70@10%
*Brass and Copper Wire on Spools*..60@5@50@10%
*Brass, list Feb. 26, '96*.....25%
*Copper, list Feb. 26, '96*.....15%
*Cast Steel Wire*.....60%
*Stubs' Steel Wire*.....$6.00 *to* £. 40%
Wire Clothes Line, see *Lines.*
Wire Picture Cord, see *Cord.*

**Bright Wire Goods—**
*List April 1, 1901*.....85@10%

**Wire Cloth and Netting—**
*Galvanized Wire Netting*..80@20@..%
*Painted Screen Cloth per 100 ft*..$1.00
*Light Hardware Grade:*
*2-18 Mesh, Plain (8c. list) sq. ft.*..1½@1¾c
*2-18 Mesh, Galv. (8c. list) sq. ft.*..2½@2¾c

**Wire, Barb**—See *Trade Report.*

**Wire Rope**—See *Rope, Wire.*

**Wrenches—**
*Agricultural*.....70@10@75@10%
*Case lots*.....75@10%
Acme.....60@10%
Alligator.....70%
Baxter's S.....60@10%
Bull Dog.....70%
Bemis & Call's:
Adjustable S.....35@5%
Adjustable S Pipe.....40%
Brigg's Pattern.....30@10%
Combination Black.....40@5%
Combination Bright.....40%
Cylinder or Gas Pipe.....55%
Extra Heavy.....45%
Merrick's Pattern.....50%
No. 3 Pipe, Bright.....55%
Bindley Automatic.....30%
Boardman's.....33⅓%
Coes' Genuine.....40@10@5@5%
Coes' "Mechanics'".....40@10@10@5@5%
Donohue's Engineer.....40@10%
Eagle.....50@10%
Elgin Wrenches.....40%
Elgin Monkey Wrench Pipe Jaws...33⅓%
Gem Pocket.....30%
Hercules.....70%
Knife Handle, Machinists' (W. & B.):
Case lots.....50@10%
Less than case lots.....50@5%
Improved Pipe (W. & B.).....6%
Solid Handles, P.S. & W.....50@50@10%
Stillson.....65%
Triumph.....60@10%

**Wrought Goods—**
*Staples, Hooks, &c., list March 17 '92*.....90@90@10%

**Yokes Neck—**
Covert Saddlery Works, Trimmed.60@5%
Covert Saddlery Works, Neck Yoke Centers.....70%

**Yokes, Ox, and Ox Bows—**
Fort Madison's Farmers & Freighters'.. list net

**Zinc—**
*Sheet*.....*lb* 6¼c@6¾c

## PAINTS, OILS AND COLORS—Wholesale Prices.

### White Lead, Zinc, &c.

Lead, English white, in Oil.....@ 9¼
Lead, American White, in Oil:
Lots of 500 ℔ or over.....@ 6¼
Lots less than 500 ℔.....@ 7
Lead, White, in oil, 25 ℔ tin pails, add to keg price.....@ ⅛
Lead, White, in oil, 12½ ℔ tin pails, add to keg price.....@ 1
Lead, White, in oil, 1 to 5 ℔ assorted tins, add to keg price..@ 1½
Lead White, Dry in bbls.....5¼@ 6
Lead, American. Terms: On lots of 500 lbs. and over, 60 days, or 2% for cash if paid in 15 days from date of invoice.
Zinc, American, dry.....℔ ℔ 4½@ 4¾
Zinc, Paris, Red Seal, dry.....@ 8½
Zinc, Paris, Green Seal, dry.....@ 9¼
Zinc, Antwerp, Red Seal, dry.....@ 6½
Zinc, Antwerp, green seal, dry..@ 8
Zinc, V. M. French, in Poppy Oil, Green Seal:
Lots of 1 ton and over.....12 @12½
Lots of less than 1 ton.....12¼@12¾
Zinc, V. M French, in Poppy Oil, Red Seal:
Lots of 1 ton and over.....10¾@11¼
Lots of less than 1 ton.....11@11½
Discounts.—V. M. French Zinc.—Discounts to buyers of 10 bbl. lots of one or assorted grades, 1%; 25 bbls., 2%; 50 bbls., 4%.

### Dry Colors.

Black, Carbon.....℔ ℔ 8 @20
Black, Drop, Amer.....4 @ 7
Black, Drop, Eug.....7 @11
Black, Ivory.....12 @21
Lamp, Com.....4½@ 6
Blue, Celestial.....℔ ℔ 4 @ 6
Blue, Chinese.....30 @35
Blue, Prussian.....28 @34
Blue, Ultramarine.....4 @20
Brown, Spanish.....¼@ 1
Brown, Vandyke, Amer.....1¾@ 2½
Brown, Vandyke, Foreign.....2½@ 3½
Carmine, No. 40.....℔ ℔ $2.05@2.75
Green, Chrome, ordinary.....5 @ 6½
Green, Chrome, pure.....16 @20
Lead, Red, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over.....@ 6
Lots less than 500 ℔.....@ 6½
Litharge, bbls. ½ bbls. and kegs:
Lots 500 ℔ or over.....@ 6
Lots less than 500 ℔.....@ 6½
Ocher, French Washed.....1¾@ 1¾
Ocher, Dutch Washed.....4¾@ 5
Ocher, American.....℔ ton $10.00@15.00
Orange Mineral, English..℔ ℔ 8½@11½
Orange Mineral, French.....11 3-16@11½
Orange Mineral, German.....8½@10½
Orange Mineral, American.....8 @ 8½
Red, Indian, English.....4½@ 8½
Red, Indian, American.....3 @ 3½
Red, Turkey, English.....4 @ 6
Red, Tuscan, English.....7 @10
Red, Venetian, Amer..℔ 100 ℔. 80@1.75
Red Venetian, English.℔ 100 ℔ 1.80@3.00
Sienna, Italian, Burnt and Powdered.....℔ ℔ 3½@ 7½
Sienna, Ital., Raw, Powd.....3½@ 7½
Sienna, American, Raw.....1½@ 2
Sienna, American, Burnt and Powdered.....℔ ℔ 1½@ 2
Talc, French.....℔ 100 ℔ $1.25@1.50
Talc, American.....90 @1.10
Terra Alba, French, ℔ 100 ℔ .95 @1.00
Terra Alba, English.....95 @1.00
Terra Alba, American No. 1....85 @85
Terra Alba, American No. 2....45 @50
Umber, Turkey, Bnt. & Pow.℔ ℔ 2½@ 3½
Umber, Turkey, Raw & Powd. 2½@ 3½
Umber, Bnt. Amer.....1½@ 2
Umber, Raw, Amer.....1½@ 2
Yellow, Chrome.....10½@25
Vermilion, American Lead.....10 @10
Vermilion, Quicksilver, bulk..@70
Vermilion, Quicksilver, bags..@71
Vermilion, English, Import..80 @95
Vermilion, Chinese.....$1.05@1.20

### Colors in Oil.

Black, Lampblack.....12 @14
Blue, Chinese.....36 @40
Blue, Prussian.....32 @36
Blue, Ultramarine.....13 @16
Brown, Vandyke.....9¼@13
Green, Chrome.....10 @12
Green, Paris.....@24
Sienna, Raw.....10 @13
Sienna, Burnt.....10 @13
Umber, Raw.....9¼@12
Umber, Burnt.....9¼@12

### Miscellaneous.

Barytes, Foreign, ℔ ton....$19.00@21.00
Barytes, Amer. floated.....19.00@20.00
Barytes, Crude, No. 1.....9.00@10.00
Chalk, in bulk.....℔ ton 2.50@ 2.60
Chalk, in bbls.....℔ 100 ℔ ..@ 35
China Clay, English..℔ ton 12.00@17.50
Cobalt, Oxide.....℔ 100 ℔ 2.25@ 2.50
Whiting, common.℔ 100 ℔ .40@ .60
Whiting, Gilders.....45@ .65
Whiting, extra Gilders'.... .55@ .68

### Putty.

In bladders.....$2.25
In bulk.....1.25
In cans 1 ℔ to 5 ℔.....3.25
In cans 12 ℔ to 25 ℔.....2.25

### Spirits Turpentine.

In Southern bbls.....37¾@38½¢
In machine bbls.....35½@ 36¾¢

### Glue.

Cabinet.....11¼@16
Extra White.....18 @23
French.....12 @40
Irish.....13¼@16
Low Grade.....℔ ℔ 9 @12
Medium White.....14½@16¾

### Animal, Fish and Vegetable Oils.

Linseed, City, raw.....℔ gal..52 @56
Linseed, City, boiled.....53 @58
Linseed, State and West'n, raw.51 @54
Linseed, raw Calcutta seed.....@85
Lard, Prime.....80 @81
Lard, Extra No. 1.....51 @55
Lard, No. 1.....47 @48
Cotton-seed, Crude.....@ ..
Cotton-seed, Summer Yellow, prime.....41 @41½
Cotton-seed Summer Yellow, off grades.....40 @40½
Sperm, Crude.....@ ..
Sperm, Natural Spring.....60 @61
Sperm, Bleached Spring.....@ ..
Sperm, Natural Winter.....65 @67
Sperm, Bleached Winter.....68 @70
Tallow, Prime.....62 @64
Whale, Crude.....@ ..
Whale, Natural Winter.....46 @47
Whale, Bleached Winter.....48 @49
Menhaden, Crude, Sound.....@ ..
Menhaden, Light Strained.....31 @32
Menhaden, Bleached Winter.....@35
Menhaden, Ex Bleached Winter 36 @37
Cocoanut, Ceylon.....7¼@ 8
Cocoanut, Cochin.....7¾@ 8¼
Cod, Domestic.....33 @34
Cod, Newfoundland.....35 @40
Red Elaine.....@42
Red Saponified.....℔ ℔ 6½@ 6¾
Olive, Italian, bbls.....59 @ 62
Neatsfoot, prime.....53 @ 54
Palm, prime, Lagos.....℔ ℔ 5½@ 5¾

### Mineral Oils.

Black, 20 gravity, 25@30 cold test.....℔ gal. 9¼@ 10¼
Black, 29 gravity, 15 cold test. 10½@ 11½
Black, summer.....9¼@ 9¾
Cylinder, light filtered.....14½@17½
Cylinder, dark filtered.....11½@15½
Paraffine, 903-907 gravity.....12¼@12¾
Paraffine, 903 gravity.....11¼@11¾
Paraffine, 883 gravity.....9½@10
Paraffine, red, No. 1.....12¾@13¾
In small lots ¼¢ advance.


# THE IRON AGE.

*The oldest paper in the world devoted to the interests of the Hardware, Iron, Machinery and Metal Trades, and a standard authority on all matters relating to those branches of industry.*

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# CURRENT METAL PRICES.

## DECEMBER 25, 1901.

The following quotations are for small lots. Wholesale prices, at which large lots only can be bought, are given elsewhere in our weekly market report.

## IRON AND STEEL—

### Bar Iron from Store—

Common Iron: Duty, Round, 0.6¢ ₩ lb; Square, 0.8¢ ₩ lb
1 to 1½ in. round and square ..... ₩ lb 1.90@2.00¢
1¼ to 4 in. x ¾ to 1 in. .....
Refined Iron:
1 to 1¾ in. round and square..... ₩ lb 1.95@2.05¢
1¼ to 4 in. x ¾ to 1 in..... ₩ lb 2.05@2.15¢
1¼ to 4 in. x ¼ to 5-16..... ₩ lb 2.25@2.35¢
Rods—¾ and 11-16 round and square. ₩ lb
Angles: Cts ₩ lb
3 in. x ¼ in. and larger..... 2.50¢
3 to 3½ in. x 5-16 in..... 2.50¢
1¼ to 3 in. x ¼ in..... 2.50¢
1¼ to 2¾ in. x 5-16 in. and thicker..... 2.20@2.30¢
1¼ to 1¾ in. x 5-16 in..... 2.30@2.40¢
1 to 1¼ in. x ¼ in..... 2.40@2.50¢
⅛ x ⅛ in..... 2.60¢
⅜ x ⅛ in..... 2.75¢
½ x ⅛ in..... 3.50¢
½ x 3-32 in..... 4.50¢
Tees:
1 in..... 2.80¢
1¼ in..... 2.60¢
1½ in. and larger..... 2.50¢
Beams..... 2.50@3.00¢
Channels, 3 in. and larger..... 2.50@3.00¢
Bands—1¼ to 6 x 5-16 to No. 8..... ₩ lb 2.30¢
"Burden's Best" Iron, base price..... ₩ lb 3.15¢
Burden's "H. B & S. Iron, base price..... ₩ lb 2.95¢
"Ulster"..... ₩ lb 3.60¢
Norway Bars..... 3.75@4.25¢
Norway Shapes..... 4.00@4.50¢

### Merchant Steel from Store—

per lb
Bessemer Machinery..... 1.90 to 1.95¢
Toe Calk, Tire and Sleigh Shoe..... 2.00@2.50¢
Best Cast Steel, base price in small lots..... 7½¢
Best Cast Steel Machinery, base price in small lots..... 6 ¢

### Soft Steel Sheets—

| | | | |
|---|---|---|---|
| ¼ inch | 2.20¢ | No. 14 | 3.00¢ |
| 5-16 inch | 2.30¢ | No. 16 | 3.20¢ |
| No. 8 | 2.40¢ | No. 18 | 3.40¢ |
| No. 10 | 2.60¢ | No. 20 | 3.70¢ |
| No. 12 | 2.90¢ | No. 22 | 3.80¢ |

### Sheet Iron from Store.

#### Black.

| | One Pass, C. R. Soft Steel. | R. G. Cleaned. |
|---|---|---|
| Nos. 14 to 16 | ₩ lb, 3.60 | 3.85¢ |
| Nos. 18 to 21 | ₩ lb, 3.70 | 3.75¢ |
| Nos. 22 to 24 | ₩ lb, 3.80 | 3.85¢ |
| Nos. 25 and 26 | ₩ lb, 3.90 | 3.95¢ |
| No. 27 | ₩ lb, 4.00 | 4.05¢ |
| No. 28 | ₩ lb, 4.10 | 4.15¢ |

### Russia, Planished, &c.

Genuine Russia, according to assortment..... ₩ lb 11@14¢
Patent Planished..... ₩ lb A, 12¢; B, 11¢, net.

### Galvanized.

| | B. B. |
|---|---|
| Nos. 10 to 16 | ₩ lb, 12¢ |
| Nos. 17 to 21 | ₩ lb, 13¢ |
| Nos. 22 to 24 | ₩ lb, 14¢ |
| Nos. 25 to 26 | ₩ lb, 15¢ |
| No. 27 | ₩ lb, 16¢ |
| No. 28 | ₩ lb, 17¢ |
| No. 29 | ₩ lb, 19¢ |
| No. 30 | ₩ lb, 21¢ |

65@67½% off.

36 in. 1¢ ₩ lb higher.

### Foreign Steel from Store—

| | |
|---|---|
| Best Cast | ₩ lb 15 ¢ |
| Extra Cast | ₩ lb 18 @ 20 ¢ |
| Swaged, Cast | ₩ lb 16 ¢ |
| Best Double Shear | ₩ lb 15 ¢ |
| Blister, 1st quality | ₩ lb 13 ¢ |
| German Steel, Best | ₩ lb 10 ¢ |
| 2d quality | ₩ lb 9 ¢ |
| 3d quality | ₩ lb 8 ¢ |
| Sheet Cast Steel, 1st quality | ₩ lb 15 ¢ |
| 2d quality | ₩ lb 14 ¢ |
| 3d quality | ₩ lb 12 ¢ |
| R. Mushet's "Special" | ₩ lb 46 ¢ |
| " " " Annealed | ₩ lb 75 ¢ |
| " " "Titanic" | ₩ lb 10 ¢ |
| Hobson's Choice XX Extra Best | ₩ lb 85 ¢ |
| Jessop Self Hardening | ₩ lb 45 ¢ |
| Seamans' "Nelson" Steel | 40 ¢ |
| Hobson's "Soho" Special Self-Hardening | ₩ lb 43 ¢ |

## METALS—

### Tin—

Duty.—Pigs, Bars and Block. Free. Per lb

| | |
|---|---|
| Banca, Pigs | 26¼@26¾¢ |
| Straits, Pigs | 26 @26¼¢ |
| Straits in Bars | 27 @27½¢ |

### Tin Plates—

#### American Charcoal Plates.

| | |
|---|---|
| Calland Grade: | |
| IC, 14 x 20 | $7.25 |
| IX, 14 x 20 | 8.75 |
| Melyn Grade: | |
| IC, 14 x 20 | 6.75 |
| IX, 14 x 20 | 8.25 |
| Allaway Grade | |
| IC, 14 x 20 | 6.25 |
| IX, 14 x 20 | 7.75 |

#### American Coke Plates—Bessemer—

| | |
|---|---|
| IC, 14 x 20 ..... 108 lb | $5.25@5.50 |
| IX, 14 x 20 | $6.25@6.75 |

#### American Terne Plates—

| | |
|---|---|
| IC, 20 x 28 | $10.25@10.50 |
| IX, 20 x 28 | 12.25@12.50 |

#### Tin Boiler Plates, American—

| | |
|---|---|
| XX, 14 x 28 ..... 112 sheets | $12.50 |
| XX, 14 x 28 ..... 112 sheets | 13.50 |
| XX, 14 x 31 ..... 119 sheets | 15.00 |

### Copper—

Duty: Pig, Bar and Ingot and Old Copper free Manufactured, 2½¢ ₩ lb.

### Ingot—

| | |
|---|---|
| Lake | 17 @17¼¢ |
| Ansonia grade Casting | 16¾@17 ¢ |

### Sheet and Bolt—

January 19, 1900. Net.
Prices, in cents per pound.
Sheet 30 x 60.

| Not wider than | Not longer than | And longer, 64 oz. & over, 9lb. sheet, 30 x 60 and heavier. | 60 oz. to 64 oz. 25 to 30 lb. | 56 oz. to 60 oz. 23½ to 25 lb. | 36 oz. to 44 oz. 15 to 18¾ lb. | 24 oz. and 25 oz. 11 to 12½ lb. | 12 oz. and 13 oz. 5¾ to 6½ lb. | 10 oz. and 11 oz. 7½ to 5½ lb. | 8 oz. and 9 oz. 6¾ to 7½ lb. | Lighter than 8 oz. |
|---|---|---|---|---|---|---|---|---|---|---|
| Ins. | Ins. | Ins. | | | | | | | | |
| 30 | 72 | ..... | 21 | 21 | 21 | 21 | 23 | 24 | 27 | 30 |
| 30 | 96 | 72 | 21 | 21 | 21 | 21 | 23 | 24 | 27 | 30 |
| 30 | ..... | 96 | 21 | 21 | 21 | 21 | 23 | 25 | 28 | 32 |
| 36 | 72 | ..... | 21 | 21 | 21 | 21 | 23 | 25 | 28 | 32 |
| 36 | 96 | 72 | 21 | 21 | 21 | 23 | 23 | 27 | 30 | |
| 36 | 120 | 96 | 21 | 21 | 21 | 23 | 24 | | | |
| 36 | ..... | 120 | 21 | 21 | 22 | 23 | | | | |
| 48 | 72 | ..... | 21 | 21 | 22 | 23 | 25 | 28 | 32 | |
| 48 | 96 | 72 | 21 | 21 | 22 | 24 | 26 | 29 | | |
| 48 | 120 | 96 | 21 | 21 | 23 | 25 | 29 | | | |
| 48 | ..... | 120 | 21 | 22 | 24 | 27 | | | | |
| 60 | 72 | ..... | 21 | 21 | 22 | 24 | 27 | 32 | | |
| 60 | 96 | 72 | 21 | 21 | 23 | 25 | 30 | | | |
| 60 | 120 | 96 | 21 | 22 | 24 | 27 | | | | |
| 60 | ..... | 120 | 21 | 23 | 25 | 29 | | | | |
| 72 | 96 | ..... | 21 | 22 | 24 | 29 | | | | |
| 72 | 144 | 96 | 21 | 23 | 26 | 32 | | | | |
| 72 | ..... | 144 | 22 | 24 | 29 | | | | | |
| 108 | 120 | ..... | 22 | 24 | 30 | | | | | |
| 108 | ..... | 120 | 24 | 25 | | | | | | |
| wider than 108 | 144 | ..... | 22 | 27 | | | | | | |
| | ..... | 144 | 23 | 29 | | | | | | |

Rolled Round Copper, ⅜ inch diameter and over, ₩ lb 21¢.
Circles, Segments and Pattern Sheets, 3¢ ₩ lb advance over price of Sheet Copper required to cut them from.
Cold or Hard Rolled Copper. 14 oz. ₩ square foot and heavier, 1¢ ₩ lb over the foregoing prices.
Cold or Hard Rolled Copper, lighter than 14 oz. ₩ square foot, 2¢ ₩ lb over the foregoing prices.
All Polished Copper, 20 in. wide and under. 1¢ ₩ lb advance over the price for Cold Rolled Copper.
All Polished Copper, over 20 in. wide, 2¢ ₩ lb advance over the price for Cold Rolled Copper.

### Planished Copper—

1¢ ₩ lb more than Polished Copper.

### Copper Bottoms, Pits and Flats—

14 oz. to square foot and heavier, ₩ lb ..... 25¢
12 oz. and up to 14 oz. to square foot, ₩ lb ..... 26¢
10 oz. and up to 12 oz., ₩ lb ..... 28¢
Lighter than 10 oz., ₩ lb ..... 31¢
Circles less than 8 in. diameter, 2¢ ₩ lb additional.
Circles over 13 in. diameter are not classed as Copper Bottoms.

### Copper Wire—

Hard and Soft Drawn—B. & S. Gauge.
*List March 2, 1900.*

| Nos. | 0000 to 8 Base | 9 and 10 | | 11 and 12 |
|---|---|---|---|---|
| | | ½¢ | | ¾¢ ₩ lb adv. |
| Nos. | 13 | 14 | 15 | 16 |
| | ¾¢ | ¼¢ | 1¢ | 1¼¢ ₩ lb adv. |
| Nos. | 17 | 18 | 19 | 20 |
| | 1¼¢ | 2¢ | 2½¢ | 2¾¢ ₩ lb adv. |

### Seamless Brass Tubes—

Standard always Stubs' gauge, unless otherwise ordered.
Feb. 6, 1899. Net. Outside Diameter.

| Stubs' W.G. | B. & S. W.G. | ¼ | 5-16 | ⅜ | 7-16 | ½ | 9-16 | ⅝ | ¾ | ⅞ | 1 | 1¼ | 1½ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4-11 | 3-9 | ..... | ..... | ..... | ..... | 33 | 31 | 30 | 29 | 28 | 27 | 25 | 24 |
| 12 | 10 | ..... | ..... | 37 | 35 | 33 | 31 | 30 | 29 | 28 | 27 | 25 | 24 |
| 13 | 11 | ..... | ..... | 37 | 35 | 33 | 31 | 30 | 29 | 28 | 27 | 25 | 24 |
| 14 | 12 | ..... | 41 | 37 | 35 | 33 | 31 | 30 | 29 | 28 | 27 | 25 | 24 |
| 15 | 13 | ..... | 42 | 38 | 36 | 33 | 32 | 31 | 30 | 29 | 28 | 26 | 25 |
| 16 | 14 | ..... | 43 | 39 | 37 | 34 | 33 | 32 | 31 | 30 | 29 | 26 | 25 |
| 17 | 15 | ..... | 44 | 40 | 38 | 35 | 34 | 33 | 32 | 31 | 30 | 27 | 26 |
| 18 | 16 | 51 | 46 | 42 | 39 | 36 | 35 | 34 | 32 | 31 | 30 | 28 | 27 |
| 19 | 17 | 50 | 47 | 43 | 40 | 37 | 36 | 35 | 34 | 33 | 32 | 30 | 29 |
| 20 | 18-19 | 54 | 49 | 44 | 41 | 39 | 38 | 37 | 36 | 35 | 34 | 32 | 31 |
| 21 | 20 | 56 | 51 | 46 | 43 | 41 | 40 | 39 | 38 | 37 | 36 | 35 | 34 |
| 22 | 21 | 71 | 58 | 48 | 44 | 42 | 41 | 40 | 39 | 38 | 37 | 37 | 36 |
| 23 | 22 | 76 | 61 | 50 | 46 | 44 | 43 | 42 | 41 | 40 | 39 | 39 | 39 |
| 24 | 23 | 81 | 66 | 53 | 48 | 46 | 45 | 44 | 43 | 43 | 42 | 40 | 41 |
| 25 | 24 | 86 | 72 | 56 | 51 | 49 | 47 | 46 | 45 | 45 | 43 | 44 | 45 |

Copper Bronze and Gilding Tube, 3¢ ₩ lb additional

### Iron Pipe Sizes—Brass

| ¼ | ⅜ | ½ | ¾ | 1 | 1¼ | 1½ | 2 | 2½ | 3 | 3½ | 4 | 4½ | 5 | 6 inch |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | 32 | 30 | 27 | 21 | 21 | 21 | 21 | 21 | 21 | 21 | 23 | 25 | 27 | 28 ₩ lb |

Copper, Bronze or Gilding Tubes, 3¢ ₩ lb additional

### Brazed Brass Tubing.

(*To No. 19, inclusive.*) Feb. 26 1896
Brown & Sharpe's gauge standard.

| | | | | | Per lb. |
|---|---|---|---|---|---|
| Plain Round Tube, ¼ in. up to 2 in. | | | | | $0.35 |
| " | " | ⅜ | " | ¾ " | .36 |
| " | " | ½ | " | ¾ " | .38 |
| " | " | ⅝ | " | ¾ " | .41 |
| " | " | 5-16 | " | ¼ " | .48 |
| " | " | ¼ | " | 5-16 " | .65 |
| " | " | 3-16 | " | ¼ " | 1.00 |
| " | " | ⅛ | " | 3-16 " | 1.50 |
| Smaller than ¼ inch | | | | | Special |
| 3 inch and larger | | | | | .40 |
| Over 3 inch to 3½ inch, inclusive | | | | | .45 |
| Over 3½ inch | | | | | .50 |

Bronze and Copper, advance on Brass List, 3 cents.
Discount from list 5 ..... 35%

### Roll and Sheet Brass—

(*Brown & Sharpe Standard Gauge.*)

| Common High Brass Wider than and including | in. 2 12 | in. 13 14 | in. 14 16 | in. 16 18 | in. 18 20 | in. 20 22 | in. 22 24 |
|---|---|---|---|---|---|---|---|
| To No. 20 inclusive | .22 | .23 | .25 | .27 | .29 | .31 | .33 |
| Nos. 21 22, 23 and 24 | .22 | .24 | .26 | .28 | .30 | .32 | .34 |
| Nos. 25 and 26 | .23 | .24½ | .27 | .29 | .31 | .33 | .35 |
| Nos. 27 and 28 | .23 | .25 | .28 | .30 | .32 | .34 | .36 |

| Common High Brass Wider than and including | in. 24 26 | in. 26 28 | in. 28 30 | in. 30 32 | in. 32 34 | in. 34 36 | in. 36 38 | in. 38 40 |
|---|---|---|---|---|---|---|---|---|
| To No. 20, inclusive | .39 | .42 | .46 | .50 | .55 | .60 | .65 | * |
| Nos. 21, 22, 23 and 24 | .40 | .43 | .47 | .51 | .56 | .61 | .68 | |
| Nos. 25 and 26 | .41 | .44 | .48 | .52 | .57 | .63 | .71 | |
| Nos. 27 and 28 | .42 | .45 | .49 | .53 | .58 | .65 | .75 | |

* Special prices not less than 80 cents.
Add ¼¢ ₩ lb additional for each number thinner than Nos. 28 to 38 inclusive. Discount from List..... 20%

### Wire in Coils. List February 26, 1896.

| Brown & Sharpe's gauge the standard. | Com. high brass. | Low brass. | Gilding bronze and copper |
|---|---|---|---|
| All Nos. to No. 10, inclusive | $0.23 | $0.27 | $0.28 |
| Above No. 10 to No. 16 | .23¼ | .27¼ | .28¼ |
| No. 17 and No. 18 | .24 | .28 | .32 |
| No. 19 and No. 20 | .25 | .29 | .33 |
| No. 21 | .26 | .30 | .34 |
| No. 22 | .27 | .31 | .35 |
| No. 23 | .28 | .32 | .36 |
| No. 24 | .30 | .34 | .38 |
| No. 25 | .32 | .36 | .40 |
| No. 26 | .35 | .39 | .43 |
| No. 27 | .38 | .42 | .46 |
| No. 28 | .42 | .46 | .51 |
| No. 29 | .45 | .49 | .54 |
| No. 30 | .48 | .52 | .59 |
| No. 31 | .51 | .55 | .67 |
| No. 32 | .55 | .59 | .78 |
| No. 33 | .59 | .63 | .89 |
| No. 34 | .64 | .68 | .95 |
| No. 35 | .70 | .74 | 1.30 |
| No. 36 | .76 | .80 | 1.50 |
| No. 37 | 1.00 | 1.04 | 1.70 |
| No. 38 | 1.80 | 1.84 | 2.00 |
| No. 39 | 2.00 | 2.00 | 3.25 |
| No. 40 | 2.60 | 2.60 | 5.75 |

Discount, Brass Wire, 20%; Copper Wire, Nil.
List November 16, '96.
Spring Wire. 2¢ ₩ lb advance.

### Tobin Bronze—

Straight, but not turned, Rods, ⅝ to 3 in. diameter, ₩ lb, net..... 20¢
Finished Piston Rods, ⅝ to 2½ in. diameter, ₩ lb net. 21¢
Other sizes and extreme lengths, special prices.

### Spelter—

Duty: In Blocks or Pigs, 1¢ ₩ lb
Western Spelter..... 4½@4¾¢

### Zinc.

Duty: Sheet, 2¢ ₩ lb.
600 lb casks..... 6¾¢ | Per lb ..... 7¾¢

### Lead.

Duty: Pigs and Bars and Old, 2½¢ ₩ lb. Pipe and Sheets, 2½¢ ₩ lb.

| | |
|---|---|
| American Pig | 4.62½@4¾¢ |
| Bar | 5¾@5¾¢ |
| Pipe | 6¾¢ ..... 20% off |
| Tin Lined Pipe | 12¼¢ ..... 20% off |
| Block Tin Pipe | 37¼¢ ..... 20% off |
| Sheet Lead, full rolls | 7¼¢ ..... 20% off |
| Sheet Lead, cut | 7¾¢ ..... 20% off |

Old Lead in exchange, 1¢ ₩ lb.

### Solder.

½ & ¼ guaranteed ..... 17½@18 ¢
No. 1 ..... 14½@16½¢

Prices of Solder indicated by private brand vary according to composition.

### Antimony—

Duty, ¾¢ ₩ lb.

| | |
|---|---|
| Cookson | ₩ lb 10½@11¢ |
| Hallett's | ₩ lb 8½@9 ¢ |
| U. S. | ₩ lb 8½@9 ¢ |

### Aluminum—

Duty: Crude, 8¢ ₩ lb. Plates, Sheets, Bars and Rods, 13¢ ₩ lb.

No. 1 Aluminum (guaranteed over 99% pure), in ingot for remelting:
Small lots ..... ₩ lb 27¢
100-lb lots ..... ₩ lb 35¢
No. 2 Aluminum (guaranteed to be over 90% pure), in ingots for remelting:
Small lots ..... ₩ lb 34¢
100-lb lots ..... ₩ lb 33¢

Aluminum Sheet, B. & S. gauge. 50 lb or more

| Wider than | 6-in. | 14-in. | 24-in. |
|---|---|---|---|
| And including | 14-in. | 24-in. | 30-in. |
| | ₩ lb. | ₩ lb. | ₩ lb |
| Nos. 13 to 19 | $0.42 | $0.44 | $0.47 |
| No. 20 | .44 | .46 | .49 |
| Nos. 21 to 23 | .46 | .48 | .51 |
| No. 24 | .46 | .50 | .53 |
| No. 25 | .47 | .51 | .54 |
| No. 26 | .47 | .54 | .59 |
| No. 27 | .48 | .57 | .62 |
| No. 28 | .48 | .57 | .64 |
| No. 29 | .49 | .60 | .69 |
| No. 30 | .50 | .64 | .77 |

*Note.*—Lots of less than 50 lb 5¢ ₩ lb extra.

Aluminum Wire, B. & S. Gauge.

| | | | |
|---|---|---|---|
| Larger than No. 9 | ₩ lb 40¢ | No. 15 | ₩ lb 48¢ |
| No. 9 to No. 10 | ₩ lb 40½¢ | No. 17 | ₩ lb 50¢ |
| No. 11 | ₩ lb 41 ¢ | No. 18 | ₩ lb 53¢ |
| No. 12 | ₩ lb 41½¢ | No. 19 | ₩ lb 60¢ |
| No. 13 | ₩ lb 42 ¢ | No. 20 | ₩ lb 65¢ |
| No. 14 | ₩ lb 42½¢ | No. 21 | ₩ lb 85¢ |

### Old Metals.

*Dealers' Purchasing Prices Paid in New York.*

| | | |
|---|---|---|
| Heavy Copper | ₩ lb | 14¼¢ |
| Light and Tinned Copper | ₩ lb | 13¼¢ |
| Heavy Brass | ₩ lb | 9 ¢ |
| Light Brass | ₩ lb | 7½¢ |
| Lead | ₩ lb | 4 ¢ |
| Tea Lead | ₩ lb | 3½¢ |
| Zinc | ₩ lb | 2½¢ |
| No. 1 Pewter | ₩ lb | 17½¢ |
| No. 2 Pewter | ₩ lb | 15½¢ |
| Tin Plate Scrap | ₩ ton | $6.00 @ 6.25 |
| Wrought Scrap Iron | ₩ gross ton | $10.50 @ 11.00 |
| Heavy Cast Scrap | ₩ gross ton | $10.25@10.50 |
| Stove Plate Scrap | ₩ gross ton | $7.75@ 8.00 |
| Burnt Iron | ₩ gross ton | $5.00@ 5.50 |

**TURN TABLES, Shop—**
Byram & Co., Inc., Detroit, Mich.
Edw. J. Etting, Philadelphia, Pa.
J. Gilmour, 99 Nassau St., New York.
Northern Engineering Works, Detroit, Mich.
Wm. Sellers & Co. (Inc.), Philadelphia, Pa.

**TURRET DRILLS, LATHES—See Drills, Lathes.**

**TUYERE IRONS—See Irons, Tuyere.**

**TUYERES, Bronze—**
Phosphor Bronze Smelting Co., Philadelphia, Pa.

**TWINE, Binder—**
American Mfg. Co., 65 Wall St., New York.
Waterbury Rope Co., 69 South St., N. Y.

**TWINE BOXES, HOLDERS—See Boxes, Holders.**

**TWIST DRILL GRINDING MACHINES—See Drill Grinding Machines, Twist.**

**TWIST DRILLS—See Drills, Twist.**

**TYPE SETTING MACHINES—**
R. H. Brown & Co., New Haven, Ct.

**TYPEWRITERS—**
Fox Machine Co., Grand Rapids, Mich.

**UMBRELLA STANDS, &c.—See Stands, &c.**

**UMBRELLAS, Wagon—**
Planet Mfg. Co., Springfield, Mass.

**UNDERWRITERS' WIRE—See Wires, Electrical.**

**UNIFORM BUTTONS—See Buttons, Uniform.**

**UNION SCALES—See Scales, Union.**

**UNIONS, Forged—**
J. H. Williams & Co., Brooklyn, N. Y.

**UNIONS, Pipe—**
Crane Co., Chicago, Ill.
E. M. Dart, Providence, R. I.
Nolte Brass Co., Springfield, O.

**UNLOADERS, Railroad—**
Lidgerwood Mfg. Co., 96 Liberty St., N. Y.

**UPHOLSTERERS' AND SADDLERS' HAMMERS—See Hammers, Saddlery and Upholsterers'.**

**UPHOLSTERERS' REGULATORS—See Regulators, Upholsterers'.**

**UPHOLSTERY AND CURTAIN FIXTURES—See Curtain and Upholstery Fixtures.**

**UPHOLSTERY HARDWARE—**
Turner & Seymour Mfg. Co., Torrington, Ct.

**UPRIGHT PULLEYS—See Pulleys, Upright.**

**UPSETTERS, Tire—**
Buffalo Forge Co., Buffalo, N. Y.
Fulton Iron & Engine Works, Detroit, Mich.

**URNS, Tea, Coffee, &c.**
V. Clad & Sons, Philadelphia, Pa.

**VACUUM PUMPS—See Pumps, Compression and Vacuum.**

**VALLEYS AND GUTTERS, in Rolls—**
Garry Iron & Steel Roofing Co., Cleveland, O.

**VALVE DISCS, ROD PACKING—See Discs, Packing.**

**VALVE FLOOR STANDS—**
Chapman Valve Mfg. Co., Boston, Mass.

**VALVES, Ammonia—**
Chapman Valve Mfg. Co., Boston, Mass.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., 71 John St., New York.
Kennedy Valve Mfg. Co., 58 Beekman St., New York.
Manning, Maxwell & Moore, 85 Liberty St., New York.

**VALVES, Balanced—**
Kennedy Valve Mfg. Co., 58 Beekman St., New York.
Mason Regulator Co., Boston, Mass.

**VALVES, Bicycle—**
Scovill Mfg. Co., Waterbury, Ct.

**VALVES, Blow Off—**
Crane Co., Chicago, Ill.
Jenkins Bros., 71 John St., New York.
Standard Pneumatic Tool Co., Chicago, Ill.
Wickes Bros., Saginaw, Mich.

**VALVES, Check—**
Crane Co., Chicago, Ill.
Goulds Mfg. Co., Seneca Falls, N. Y.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., 71 John St., New York.
Kennedy Valve Mfg. Co., 58 Beekman St., New York.
Lunkenheimer Company, Cincinnati, O.
McNab & Harlin Mfg. Co., 56 John St., New York.
Nolte Brass Co., Springfield, O.

**VALVES, Fire Sprinkler—**
International Sprinkler Co., Philadelphia, Pa.

**VALVES, Gate—**
Best Mfg. Co., Pittsburgh, Pa.
Crane Co., Chicago, Ill.
Jenkins Bros., 71 John St., New York.
Kennedy Valve Mfg. Co., 58 Beekman St., New York.
Pennsylvania Engineering Works, New Castle, Pa.
Pittsburgh Valve Foundry & Construction Co., Pittsburgh, Pa.
Vincent Valve Co., Sandusky, O.
Watson-Stillman Co., 204-210 East 43d St., New York.
R. D. Wood & Co., Philadelphia, Pa.

**VALVES, Lever—**
Jenkins Bros., 71 John St., New York.
Mason Regulator Co., Boston, Mass.

**VALVES, PUMP—See Well Supplies and Tools.**

**VALVES, Radiator—**
Crane Co., Chicago, Ill.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., 71 John St., New York.
Kennedy Valve Mfg. Co., 58 Beekman St., New York.
Lunkenheimer Company, Cincinnati, O.
Vincent Valve Co., Sandusky, O.

**VALVES, Reducing—**
Fairbanks Co., 311 Broadway, New York.
Manning, Maxwell & Moore, 85 Liberty St., New York.
Mason Regulator Co., Boston, Mass.
Watson-Stillman Co., 204-210 East 43d St., New York.

**VALVES, Relief—**
Ashton Valve Co., Boston, Mass.
Crane Co., Chicago, Ill.
Julian D'Este Co., Boston, Mass.
Fairbanks Co., 311 Broadway, New York.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., 71 John St., New York.
Lunkenheimer Company, Cincinnati, O.
Manning, Maxwell & Moore, 85 Liberty St., New York.
John H. McGowan & Co., Cincinnati, O.
Watson-Stillman Co., 204-210 East 43d St., New York.

**VALVES, Rubber—**
Boston Belting Co., Boston, Mass.
H. O. Canfield, Bridgeport, Ct.
Crane Co., Chicago, Ill.
Jenkins Bros., 71 John St., New York.

**VALVES, Safety—**
Ashton Valve Co., Boston, Mass.
Crane Co., Chicago, Ill.
Fairbanks Co., 311 Broadway, New York.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., 71 John St., New York.
Kennedy Valve Mfg. Co., 58 Beekman St., New York.
Lunkenheimer Company, Cincinnati, O.
Manning, Maxwell & Moore, 85 Liberty St., New York.
McNab & Harlin Mfg. Co., 56 John St., New York.
Watson-Stillman Co., 204-210 East 43d St., New York.

**VALVES, Sniffing—**
Ashton Valve Co., Boston, Mass.
Crane Co., Chicago, Ill.
Lunkenheimer Company, Cincinnati, O.

**VALVE STEMS—**
Crane Co., Chicago, Ill.
Finished Steel Co., Youngstown, O.
Phosphor Bronze Smelting Co., Philadelphia, Pa.
J. H. Williams & Co., Brooklyn, N. Y.

**VALVES, Vacuum Regulating—**
Manning, Maxwell & Moore, 85 Liberty St., New York.
Mason Regulator Co., Boston, Mass.

**VALVES, Water, Gas and Steam—**
American Engineering Works, Chicago, Ill.
Ashton Valve Co., Boston, Mass.
Chapman Valve Mfg. Co., Boston, Mass.
Crane Co., Chicago, Ill.
Hollands Mfg. Co., Erie, Pa.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., 71 John St., New York.
Kennedy Valve Mfg. Co., 58 Beekman St., New York.
Lunkenheimer Company, Cincinnati, O.
Manning, Maxwell & Moore, 85 Liberty St., New York.
McNab & Harlin Mfg. Co., 56 John St.,
Nolte Brass Co., Springfield, O.
Philadelphia Roll & Machine Co., Philadelphia, Pa.
Pleuger & Henger Mfg. Co., St. Louis, Mo.
Watson-Stillman Co., 204-210 East 43d St., New York.
R. D. Wood & Co., Philadelphia, Pa.

**VALVES, Water Reducing—**
Crane Co., Chicago, Ill.
Jenkins Bros., 71 John St., New York.
Manning, Maxwell & Moore, 85 Liberty St., New York.
Mason Regulator Co., Boston, Mass.

**VALVES, Water Relief—**
Ashton Valve Co., Boston, Mass.
Lunkenheimer Company, Cincinnati, O.
Manning, Maxwell & Moore, 85 Liberty St., New York.
Mason Regulator Co., Boston, Mass.
McNab & Harlin Mfg. Co., 56 John St., N. Y.

**VALVE WHEELS, STEAM—See Wheels, Steam Valve.**

**VANES, SHEET IRON—See Finials and Vanes, Sheet Iron.**

**VANES, WEATHER—See Iron and Brass, Ornamental.**

**VAPOR LAMPS, GASOLINE—See Lamps, Gasoline, Gas.**

**VARNISH CANS—See Cans, Paint and Varnish.**

**VARNISHES, Armature—**
Standard Paint Co., 100 William St., New York.

**VARNISHES, JAPANS, &c.—**
Wm. Connors Paint Mfg. Co., Troy, N. Y.
Wadsworth-Howland Co., Chicago, Ill.

**VARNISHING MACHINES—**
Chambers Bros. Co., Philadelphia, Pa.

**VASES, Coal—**
Keen & Hagerty Mfg. Co., Baltimore, Md.
Sidney Shepard & Co., Buffalo, N. Y.

**VASES, Decorated Metal—**
M. S. Benedict Mfg. Co., East Syracuse, N.Y.
Goodwin & Kintz Co., Winsted, Ct.

**VASES, Lawn—**
E. T. Barnum, Detroit, Mich.
H. P. Deuscher Co., Hamilton, O.
Ellis & Halfenbarger, Indianapolis, Ind.
C. Hanika & Sons, Celina, O.
Ludlow-Saylor Wire Co., St. Louis, Mo.
F. J. Meyers Mfg. Co., Hamilton, O.
Ornamental Iron & Wire Co., Chattanooga, Tenn.
Stewart Iron Works, Cincinnati, O.
Van Dorn Iron Works Co., Cleveland, O.

**VASES, Silver Plated—**
International Silver Co., 9-13 Maiden Lane, New York.

**VAULTS, Fire and Burglar Proof.**
Van Dorn Iron Works Co., Cleveland, O.

**VEGETABLE AND MEAT CUTTERS—See Cutters, Meat and Vegetable.**

**VEGETABLE BOILERS, WIRE—See Kitchen Articles, Wire.**

**VEGETABLE MASHERS, PARERS, &c.—See Mashers, Parers, &c.**

**VEHICLES, BUGGIES, CARRIAGES, &c.—**
Consolidated Railway Electric Lighting & Equipment Co., Derby, Ct.

**VEHICLE WHEELS—See Wheels, Vehicle.**

**VENEER CUTTERS—See Cutters, Veneer.**

**VENEERING SAWS—See Saws, Segment or Veneering.**

**VENTILATING AND HEATING APPARATUS—See Heating and Ventilating Apparatus.**

**VENTILATING SYSTEM, Balanced—**
E. A. Ormsby, Melrose, Mass.

**VENTILATOR CAPS, CORD—See Caps, Cord.**

**VENTILATORS—See Registers and Ventilators.**

**VENTILATORS AND CHIMNEY CAPS—**
G. Drouve Co., Bridgeport, Ct.
Garry Iron & Steel Roofing Co., Cleveland, O.
Hess, Snyder & Co., Massillon, O.
Merchant & Co., Philadelphia, Pa.
Osborn Mfg. Co., Cleveland, O.
Wiley & Russell Mfg. Co., Greenfield, Mass.

**VENTILATORS, Barn, &c., Sheet Iron—**
Merchant & Co., Philadelphia, Pa.
E. Van Noorden Co., Boston, Mass.

**VENTILATORS, Flue—**
Merchant & Co., Philadelphia, Pa.
Stowell Mfg. & Foundry Co., South Milwaukee, Wis.

**VENTILATORS, Hood—**
Edson Mfg. Co., Boston, Mass.

**VIBRATORY AXLE SCALES—See Scales, Vibratory Axle.**

**VIOLIN CLAMP SCREWS—See Screws, Guitar and Violin Clamp.**

**VISE AND ANVIL—See Anvil and Vise.**

**VISE ATTACHMENTS—**
Tower & Lyon, 95 Chambers St., New York.

**VISE CLAMPS, JAWS—See Clamps, Jaws.**

**VISE GRIPS, Pipe—**
Prentiss Vise Co., 44 Barclay St., N. Y.

**VISE JAW CAPS—**
Prentiss Vise Co., 44 Barclay St., N. Y.

**VISES, Bicycle—**
Hollands Mfg. Co., Erie, Pa.
Lewis Tool Co., 44 Barclay St., New York.
Massey Vise Co., Chicago, Ill.
Prentiss Vise Co., 44 Barclay St., N. Y.

**VISES, Cabinet—**
Massey Vise Co., Chicago, Ill.
Tower & Lyon, 95 Chambers St., New York.
Wyman & Gordon, Worcester, Mass.

**VISES, Carpenters' Wooden—**
R. Bliss Mfg. Co., Pawtucket, R. I.

**VISES, Coach Makers'—**
Massey Vise Co., Chicago, Ill.
Chas. Parker Co., Meriden, Ct.

**VISES, Die Sinkers'—**
Chas. Parker Co., Meriden, Ct.

**VISES, Drill and Anvil—**
Adams Co., Dubuque, Ia.
Millers Falls Co., 28 Warren St., N. Y.
Prentiss Vise Co., 44 Barclay St., N. Y.

**VISES, Drill Press—**
Massey Vise Co., Chicago, Ill.

**VISES, Hand—**
Athol Machine Co., Athol, Mass.
Billings & Spencer Co., Hartford, Ct.
Braunsdorf-Mueller Co., Elizabeth, N. J.
Goodell-Pratt Co., Greenfield, Mass.
Logan & Strobridge Iron Co., New Brighton, Pa.
Millers Falls Co., 28 Warren St., N. Y.
Utica Drop Forge & Tool Co., Utica, N. Y.

**VISES, Horseshoers'—**
Becker-Brainard Milling Machine Co., Jamaica Plain, Mass.
Blake & Johnson, Waterbury, Ct.
P. F. Burke, Boston, Mass.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

**VISES, Milling Machine—**
Brown & Sharpe Mfg. Co., Providence, R. I.
Carter & Hakes Machine Co., Winsted, Ct.
Fox Machine Co., Grand Rapids, Mich.
Hill, Clarke & Co., Boston, Mass.
Massey Vise Co., Chicago, Ill.
Pratt & Whitney Co., Hartford, Ct.

**VISES, Parallel—**
Adams Co., Dubuque, Ia.
Athol Machine Co., Athol, Mass.
Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Lewis Tool Co., 44 Barclay St., New York.
Massey Vise Co., Chicago, Ill.
Merrill Bros., Brooklyn, N. Y.
Millers Falls Co., 28 Warren St., N. Y.
Chas. Parker Co., Meriden, Ct.
Prentiss Vise Co., 44 Barclay St., N. Y.
Tower & Lyon, 95 Chambers St., N. Y.

**VISES, Pipe—**
Armstrong Mfg. Co., Bridgeport, Ct.
Bignall & Keeler Mfg. Co., Edwardsville, Ind.
Butterfield & Co., Derby Line, Vt.
Crane Co., Chicago, Ill.
Curtis & Curtis, Bridgeport, Ct.
Exeter Machine Works, Exeter, N. H.
A. L. Henderer's Sons, Wilmington, Del.
Hollands Mfg. Co., Erie, Pa.
Humphryes Mfg. Co., Mansfield, O.
Jarecki Mfg. Co., Erie, Pa.
Lewis Tool Co., 44 Barclay St., New York.
Massey Vise Co., Chicago, Ill.
Chas. Parker Co., Meriden, Ct.
Prentiss Vise Co., 44 Barclay St., N. Y.
Sandwich Enterprise Co., Sandwich, Ill.
D. Saunders' Sons, Yonkers, N. Y.
Tower & Lyon, 95 Chambers St., N. Y.

**VISES, Planer—**
Gould & Eberhardt, Newark, N. J.
Massey Vise Co., Chicago, Ill.
Pond Machine Tool Co., Plainfield, N. J.
Pratt & Whitney Co., Hartford, Ct.

**VISES, Saw—**
E. C. Atkins & Co., Indianapolis, Ind.
Henry Disston & Sons, Philadelphia, Pa.
Doebler Mfg. Co., Middletown, Ct.
C. E. Jennings Co., 101 Reade St., N. Y.
John C. Kupferle, St. Louis, Mo.
Chas. Parker Co., Meriden, Ct.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

**VISES, Solid Box—**
Eagle Anvil Works, Trenton, N. J.
Tower & Lyon, 95 Chambers St., New York.

**VISES, Tubing, Polished—**
Hollands Mfg. Co., Erie, Pa.

**VISES, Woodworkers'—**
Massey Vise Co., Chicago, Ill.
Wyman & Gordon, Worcester, Mass.

**VITRIOL, Blue—**
American Steel & Wire Co., Chicago, Ill.
United Metals Selling Co., 11 Broadway, New York.

**VOLT METERS—See Meters, Recording Volt.**

**WADS, Gun—**
Peters Cartridge Co., Cincinnati, O.
Union Metallic Cartridge Co., 313-315 Broadway, New York.

**WAFFLE IRONS—See Irons, Waffle.**

**WAGON AND CARRIAGE MACHINERY—**
Defiance Machine Works, Defiance, O.
J. A. Fay & Co., Cincinnati, O.
Williams, White & Co., Moline, Ill.

**WAGON AXLES, CHAINS, &c.—See Axles, Chains, &c.**

**WAGONS, Delivery—**
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

**WAGONS, Dump—**
Kilbourne & Jacobs Mfg. Co., Columbus, O.

**WAGONS, Farm, &c.—**
Electric Wheel Co., Quincy, Ill.

**WAGONS, MOTOR—See Carriages.**

**WAGON TANKS—See Tanks, Wagon, Oil, and Sprinkling.**

**WAGON WHEEL MACHINES—See Wheel Machines, Wagon.**

**WAITERS, Dumb—**
Energy Elevator Co., Philadelphia, Pa.
Morse, Williams & Co., Philadelphia, Pa.
J. G. Speidel, Reading, Pa.
Storm Mfg. Co., Newark, N. J.
Variety Machine Co., Warsaw, N. Y.
Warner Elevator Mfg. Co., Cincinnati, O.

**WAITERS, Silver Plated—**
International Silver Co., 9-13 Maiden Lane, New York.

**WALK SCRAPERS—See Scrapers, Walk and Street.**

**WALL SCRAPERS—See Scrapers.**

**WARDROBE HOOKS—See Hooks, Coat, Hat, &c.**

**WARDROBES, OFFICE AND SHOP—See Lockers.**

**WARE, Aluminum—**
Norton Mfg. Co., Chester, Ct.
Sidney Shepard & Co., Buffalo, N. Y.

**WARE, Copper—**
Sidney Shepard & Co., Buffalo, N. Y.

**WARE, Decorated, Metal Mounted—**
M. S. Benedict Mfg. Co., East Syracuse, N.Y.

**WARE, Enameled—**
Cleveland Stamping & Tool Co., Cleveland.
Keen & Hagerty Mfg. Co., Baltimore, Md.

**WARE, Hollow, Silver and Silver Plated—**
M. S. Benedict Mfg. Co., East Syracuse, N.Y.
International Silver Co., 9-13 Maiden Lane, New York.
Simeon L. & Geo. H. Rogers Co., Hartford, Ct.

**WARE, Hollow, Steel—**
Avery Stamping Co., Cleveland, O.
Cleveland Stamping & Tool Co., Cleveland.
Keen & Hagerty Mfg. Co., Baltimore, Md.

**WAREHOUSE BASKETS—See Wheelers.**

**WAREHOUSE TRUCKS—See Trucks, Store, Warehouse, &c.**

**WARE, Sheet Iron—**
Keen & Hagerty Mfg. Co., Baltimore, Md.
Sidney Shepard & Co., Buffalo, N. Y.

**WARE, TIN—See Tinware.**

**WARE, Wooden—**
Hill Dryer Co., Worcester, Mass.

**WARM AIR FURNACES—See Furnaces, Warm Air.**

**WARMERS, Plate, Pie, Cake, &c.—**
V. Clad & Sons, Philadelphia, Pa.

**WASH BENCHES, STANDS—See Stands and Benches, Tub.**

**WASHBOARD BLANKS—**
Matthiessen & Hegeler Zinc Co., La Salle Ill.

**WASHBOARD KNIVES—See Knives, Machine.**

**WASHBOARDS—**
Lloyd Mfg. Co., Minneapolis, Minn.
Saginaw Mfg. Co., Saginaw, Mich.

**WASHER CUTTERS—See Cutters, Washer.**

**WASHER MACHINES—**
National Machinery Co., Tiffin, O.

**WASHER PUNCHES—See Punches, Washer.**

**WASHERS AND DISKS, Rubber—See Gaskets and Rings, Rubber.**

**WASHERS AND STREET HYDRANT—See Hydrants and Street Washers**

**WASHERS, Brass—**
American Hardware Mfg. Co., Ottawa, Ill.
Wm. H. Haskell Mfg. Co., Pawtucket, R. I.
Wilson & Smith, Worcester, Mass.

**WASHERS, Cast—**
American Iron & Steel Mfg. Co., Lebanon, Pa.
Bethlehem Foundry & Machine Co., South Bethlehem, Pa.
Wm. H. Haskell Mfg. Co. Pawtucket, R. I.
John C. Kupferle, St. Louis, Mo.
Henry B. Newhall, 26 Cortlandt St., N. Y.
Pleuger & Henger Mfg. Co., St. Louis, Mo.
Port Chester Bolt & Nut Co., Port Chester, N. Y.
Republic Iron & Steel Co., Chicago, Ill.
Rockford Bolt Works, Rockford, Ill.
Stover Mfg. Co., Freeport, Ill.
Wilson & Smith, Worcester, Mass.

**WASHERS, FLOOR—See Plates and Washers, Floor.**

**WASHERS, Lead—**
Wilson & Smith, Worcester, Mass.

**WASHERS, Leather—**
Barnes Mfg. Co., Mansfield, O.
W. J. Clark Co., Salem, O.
Raymond Mfg. Co., Corry, Pa.

**WASHERS, Prop Block—**
McKinnon Dash Co., Buffalo, N. Y.

**WASHERS, Wrought—**
American Hardware Mfg. Co., Ottawa, Ill.
American Iron & Steel Mfg. Co., Lebanon, Pa.
Avery Stamping Co., Cleveland, O.
Cincinnati Screw & Tap Co., Cincinnati, O.
W. J. Clark Co., Salem, O.
Clark & Cowles, Plainville, Ct.
Enterprise Foundry Co., Cincinnati, O.
Grand Crossing Tack Co., Chicago, Ill.
Griffin Mfg. Co., Allegheny, Pa.
Sam'l Hall's Sons, 229-233 W. 10th St., New York.
Wm. H. Haskell Mfg. Co. Pawtucket, R. I.
Jenkins Bros., 71 John St., New York.
M. Lanz & Sons, Pittsburgh, Pa.
McKinney Mfg. Co., Allegheny, Pa.
Milton Mfg. Co., Milton, Pa.
Nut & Washer Mfg. Co., Milwaukee, Wis.
Plymouth Mills, Plymouth, Mass.
Port Chester Bolt & Nut Co., Port Chester, N. Y.
Republic Iron & Steel Co., Chicago, Ill.
Rhode Island Tool Co., Providence, R. I.
Rockford Bolt Works, Rockford, Ill.
Shelton Co., Derby, Ct.
Stanley Works, New Britain, Ct.
Wheeling Hinge Co., Wheeling, W. Va.
Wilcox, Crittenden & Co., Middletown, Ct.
Wilson & Smith, Worcester, Mass.

**WASHING AND SEPARATING MACHINERY, Ore—**
Aultman Co., Canton, O.
Jeffrey Mfg. Co., Columbus, O.

**WASHING MACHINERY, COAL—See Coal Washing Machinery.**

**WASHING MACHINES—**
American Mfg. Co., Lockland, O.
N. C. Baughman, York, Pa.
Bluffton Mfg. Co., Bluffton, Ind.
Boss Washing Machine Co., Cincinnati, O.
H. F. Brammer Mfg. Co., Davenport, Ia.
Clark, Quien & Morse, Peoria, Ill.
Anthony Wayne Mfg. Co., Fort Wayne, Ind.

**WASTE BASKETS, CANS—See Baskets, Cans.**

**WASTE BOXES, CAST IRON—See Boxes, Cast Iron Waste.**

**WASTE, COTTON—**
A. Leschen & Sons Rope Co., St. Louis, Mo.
Railway Supply Co., St. Louis, Mo.

**WATCH CASES—See Cases, Watch.**

**WATCHMAKERS' SUPPLIES—See Jobbers', Watchmakers' Supplies.**

**WATCHMEN'S CLOCKS—See Clocks, Watchmen's.**

**WATER CLOSET HINGES—See Hinges, Water Closet Seat.**

**WATER COOLERS, ELEVATORS, &c.—See Coolers, Elevators, &c.**

**WATERERS, STOCK—See Stock Waterers.**

**WATER PIPE, RIVETED—See Pipe, Riveted Steel.**

**WATER WHEELS—**
W. J. Clark Co., Salem, O.
Dubuque Machine Concern, Dubuque, Iowa.
James Leffel & Co., Springfield, O.
R. Poole & Son Co., Baltimore, Md.
Craig Ridgway & Son Co., Coatesville, Pa.
R. D. Wood & Co., Philadelphia, Pa.

**WATER WORKS SUPPLIES—**
Ingersoll-Sergeant Drill Co., 26 Cortlandt St., New York.
McKiernan Drill Co., 120 Liberty St., New York.
Charles Millar & Son, Utica, N. Y.
Pleuger & Henger Mfg. Co., St. Louis, Mo.

**WATT METERS, RECORDING—See Meters, Recording Watt.**

**WAX, Fruit Can—**
Markle Lead Works, St. Louis, Mo.

**WAX MELTING CUPS—See Cups, Wax Melting.**

**WEATHERPROOF WIRE—See Wires, Electrical.**

**WEAVING MACHINERY, Wire Mattress—**
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

**WEAVING MACHINES, Rattan—**
Chas. Leffler & Co., Brooklyn, N. Y.

**WEB GIRTS, HALTERS—See Girts, Halters.**

**WEBS, Turning, Felloe, &c.—**
E. C. Atkins & Co., Indianapolis, Ind.
Henry Disston & Sons, Philadelphia, Pa.
C. E. Jennings Co., 101 Reade St., N. Y.
Millers Falls Co., 28 Warren St., N. Y.
National Saw Co., Newark, N. J.
Simonds Mfg. Co., Fitchburg, Mass.

**WEDGES, Axe—**
Walter W. Woodruff & Sons Co., Mount Carmel, Pa.

**WEDGES, Granite—**
Hawkridge Bros., Boston, Mass.

**WEDGES, Wood Choppers'—**
Cape Ann Tool Co., Pigeon Cove, Mass.

**WEEDERS, Garden—**
Arcade Mfg. Co., Freeport, Ill.
W. J. Clark Co., Salem, O.
Iowa Farming Tool Co., Fort Madison, Ia.
Terre Haute Shovel & Tool Co., Terre Haute, Ind.

**WEEDING HOOKS—See Hooks, Weeding.**

**WEIGHING MACHINES, Automatic, for Granular Materials—**
Pratt & Whitney Co., Hartford, Ct.

**WEIGHTS, Hitching—**
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.
Imperial Bit & Snap Co., Racine, Wis.
John C. Kupferle, St. Louis, Mo.
Logan & Strobridge Iron Co., New Brighton, Pa.
Pleuger & Henger Mfg. Co., St. Louis, Mo.

**WEIGHTS, Paper—**
Wrightsville Hardware Co., Wrightsville, Pa.

**WEIGHTS, Sash—**
Allston Foundry Co., Boston, Mass.
Barney & Reed Mfg. Co., Boston, Mass.
E. E. Brown & Co., Philadelphia, Pa.
Enterprise Foundry Co., Cincinnati, O.
C. Hanika & Sons, Celina, O.
John C. Kupferle, St. Louis, Mo.

**WEIGHTS, SCALE—See Scale Manufacturers.**

**WEIGHTS, Test—**
Standard Scale & Supply Co., Pittsburgh.

**WELDING, Electric—**
Standard Welding Co., Cleveland, O.

**WELDING MACHINES, Tire—**
Long & Allstatter Co., Hamilton, O.
Williams, White & Co., Moline, Ill.

**WELL CHAINS, CURBS, &c.—See Chains, Curbs, &c.**

**WELL MACHINERY—**
Dubuque Machine Concern, Dubuque, Iowa.
Flint & Walling Mfg. Co., Kendallville, Ind.

**WELL SUPPLIES AND TOOLS (Points, Cylinders, Valves, Tubular Well Tools, &c.)—**
Barnes Mfg. Co., Mansfield, O.
A. D. Cook, Lawrenceburg, Ind.
Crane Co., Chicago, Ill.
Deming Co., Salem, O.
Dubuque Machine Concern, Dubuque, Iowa.
Stanley G. Flagg & Co., Philadelphia, Pa.
Flint & Walling Mfg. Co., Kendallville, Ind.
Goulds Mfg. Co., Seneca Falls, N. Y.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., 71 John St., New York.
F. E. Myers & Bro., Ashland, O.
Union Mfg. Co., New Britain, Ct.

**WHARF SPIKES—See Spikes, Dock, Wharf, &c.**

**WHEELBARROWS—**
Osborn Mfg. Co., Cleveland, O.
See also *Barrows, Wheel.*

**WHEEL CUTTERS, Clock—**
Cross & Speirs Machine Co., Waterbury, Ct.

**WHEELERS—**
Crane Bros., Westfield, Mass.

**WHEEL MOLDING MACHINES, CAR—See Molding Machines, Car Wheel.**

**WHEEL MACHINES, Wagon—**
Defiance Machine Works, Defiance, O.

**WHEEL PRESSES, CAR—See Presses, Car Wheel.**

**WHEELS—See Axles and Wheels.**

**WHEELS, Balance.**
Jones & Laughlins, Ltd., Pittsburgh, Pa.

**WHEELS, Ball Bearing—**
Atlas Bolt & Screw Co., Cleveland, O.
McCabe Hanger Mfg. Co., 532-542 W. 22d St., New York.

**WHEELS, Barrow—**
Electric Wheel Co., Quincy, Ill.
Havana Metal Wheel Co., Havana, Ill.
Kilbourne & Jacobs Mfg. Co., Columbus, O.
Sidney Steel Scraper Co., Sidney, O.
West Side Foundry Co., Troy, N. Y.

**WHEELS, Car—**
American Engineering Works, Chicago, Ill.
Atlas Bolt & Screw Co., Cleveland, O.
Braddock Machine & Mfg. Co., Braddock, Pa.
Edw. J. Etting, Philadelphia, Pa.
Ferro-Carbon Castings Co., Philadelphia.
Keagy & Lear Machine Co., Coshocton, O.
Henry Levis & Co., Philadelphia, Pa.
Pierson & Co., 29 Broadway, New York.
Ramapo Car Wheel Co., Ramapo, N. Y.

**WHEELS, Carborundum—**
Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., Chicago, Ill.

**WHEELS, Caster, Soft Rubber—**
M. B. Schenck Co., Meriden, Ct.

**WHEELS, CHILLED CAR—See Car Wheels, Chilled.**

**WHEELS, Clock—**
Reeves Mfg. Co., New Haven, Ct.

**WHEELS, Corundum—**
Bridgeport Safety Emery Wheel Co., Bridgeport, Ct.
Chicago Wheel & Mfg. Co., Chicago, Ill.
Northampton Emery Wheel Co., Leeds, Mass.
Star Corundum Wheel Co., Detroit, Mich.
Sterling Emery Wheel Mfg. Co., Tiffin, O.
Vitrified Emery Wheel Co., Westfield, Mass.

**WHEELS, Dental—**
Chicago Wheel & Mfg. Co., Chicago, Ill.
Pike Mfg. Co., Pike Station, N. H.

**VEGETABLE MASHERS, PARERS, &c.—See Mashers, Parers, &c.**

**VEHICLES, BUGGIES, CARRIAGES, &c.—**
Consolidated Railway Electric Lighting & Equipment Co., Derby, Ct.

**VEHICLE WHEELS—See Wheels, Vehicle.**

**VENEER CUTTERS—See Cutters, Veneer.**

**VENEERING SAWS—See Saws, Segment or Veneering.**

**VENTILATING AND HEATING APPARATUS—See Heating and Ventilating Apparatus.**

**VENTILATING SYSTEM, Balanced—**
E. A. Ormsby, Melrose, Mass.

**VENTILATOR CAPS, CORD—See Caps, Cord.**

**VENTILATORS—See Registers and Ventilators.**

**VENTILATORS AND CHIMNEY CAPS—**
G. Drouve Co., Bridgeport, Ct.
Garry Iron & Steel Roofing Co., Cleveland, O.
Hess, Snyder & Co., Massillon, O.
Merchant & Co., Philadelphia, Pa.
Osborn Mfg. Co., Cleveland, O.
Wiley & Russell Mfg. Co., Greenfield, Mass.

**VENTILATORS, Barn, &c., Sheet Iron—**
Merchant & Co., Philadelphia, Pa.
E. Van Noorden Co., Boston, Mass.

**VENTILATORS, Flue—**
Merchant & Co., Philadelphia, Pa.
Stowell Mfg. & Foundry Co., South Milwaukee, Wis.

**VENTILATORS, Hood—**
Edson Mfg. Co., Boston, Mass.

**VIBRATORY AXLE SCALES—See Scales, Vibratory Axle.**

**VIOLIN CLAMP SCREWS—See Screws, Guitar and Violin Clamp.**

**VISE AND ANVIL—See Anvil and Vise.**

**VISE ATTACHMENTS—**
Tower & Lyon, 95 Chambers St., New York.

**VISE CLAMPS, JAWS—See Clamps, Jaws.**

**VISE GRIPS, Pipe—**
Prentiss Vise Co., 44 Barclay St., N. Y.

**VISE JAW CAPS—**
Prentiss Vise Co., 44 Barclay St., N. Y.

**VISES, Bicycle—**
Hollands Mfg. Co., Erie, Pa.
Lewis Tool Co., 44 Barclay St., New York.
Massey Vise Co., Chicago, Ill.
Prentiss Vise Co., 44 Barclay St., N. Y.

**VISES, Cabinet—**
Massey Vise Co., Chicago, Ill.
Tower & Lyon, 95 Chambers St., New York.
Wyman & Gordon, Worcester, Mass.

**VISES, Carpenters' Wooden—**
R. Bliss Mfg. Co., Pawtucket, R. I.

**VISES, Conch Makers'—**
Massey Vise Co., Chicago, Ill.
Chas. Parker Co., Meriden, Ct.

**VISES, Die Sinkers'—**
Chas. Parker Co., Meriden, Ct.

**VISES, Drill and Anvil—**
Adams Co., Dubuque, Ia.
Millers Falls Co., 28 Warren St., N. Y.
Prentiss Vise Co., 44 Barclay St., N. Y.

**VISES, Drill Press—**
Massey Vise Co., Chicago, Ill.

**VISES, Hand—**
Athol Machine Co., Athol, Mass.
Billings & Spencer Co., Hartford, Ct.
Braunsdorf-Mueller Co., Elizabeth, N. J.
Goodell-Pratt Co., Greenfield, Mass.
Logan & Strobridge Iron Co., New Brighton, Pa.
Millers Falls Co., 28 Warren St., N. Y.
Utica Drop Forge & Tool Co., Utica, N. Y.

**VISES, Horseshoers'—**
Becker-Brainard Milling Machine Co., Jamaica Plain, Mass.
Blake & Johnson, Waterbury, Ct.
P. F. Burke, Boston, Mass.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

**VISES, Milling Machine—**
Brown & Sharpe Mfg. Co., Providence, R. I.
Carter & Hakes Machine Co., Winsted, Ct.
Fox Machine Co., Grand Rapids, Mich.
Hill, Clarke & Co., Boston, Mass.
Massey Vise Co., Chicago, Ill.
Pratt & Whitney Co., Hartford, Ct.

**VISES, Parallel—**
Adams Co., Dubuque, Ia.
Athol Machine Co., Athol, Mass.
Bignall & Keeler Mfg. Co., Edwardsville, Ill.
Hollands Mfg. Co., Erie, Pa.
Howard Iron Works, Buffalo, N. Y.
Lewis Tool Co., 44 Barclay St., New York.
Massey Vise Co., Chicago, Ill.
Merrill Bros., Brooklyn, N. Y.
Millers Falls Co., 28 Warren St., N. Y.
Chas. Parker Co., Meriden, Ct.
Prentiss Vise Co., 44 Barclay St., N. Y.
Tower & Lyon, 95 Chambers St., N. Y.

**VISES, Pipe—**
Armstrong Mfg. Co., Bridgeport, Ct.
Bignall & Keeler Mfg. Co., Edwardsville, Ind.
Butterfield & Co., Derby Line, Vt.
Crane Co., Chicago, Ill.
Curtis & Curtis, Bridgeport, Ct.
Exeter Machine Works, Exeter, N. H.
A. L. Henderer's Sons, Wilmington, Del.
Hollands Mfg. Co., Erie, Pa.
Humphryes Mfg. Co., Mansfield, O.
Jarecki Mfg. Co., Erie, Pa.
Lewis Tool Co., 44 Barclay St., New York.
Massey Vise Co., Chicago, Ill.
Chas. Parker Co., Meriden, Ct.
Prentiss Vise Co., 44 Barclay St., N. Y.
Sandwich Enterprise Co., Sandwich, Ill.
D. Saunders' Sons, Yonkers, N. Y.
Tower & Lyon, 95 Chambers St., N. Y.

**VISES, Planer—**
Gould & Eberhardt, Newark, N. J.
Massey Vise Co., Chicago, Ill.
Pond Machine Tool Co., Plainfield, N. J.
Pratt & Whitney Co., Hartford, Ct.

**VISES, Saw—**
E. C. Atkins & Co., Indianapolis, Ind.
Henry Disston & Sons, Philadelphia, Pa.
Doebler Mfg. Co., Middletown, Ct.
C. E. Jennings Co., 101 Reade St., N. Y.
John C. Kupferle, St. Louis, Mo.
Chas. Parker Co., Meriden, Ct.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.

**VISES, Solid Box—**
Eagle Anvil Works, Trenton, N. J.
Tower & Lyon, 95 Chambers St., New York.

**VISES, Tubing, Polished—**
Hollands Mfg. Co., Erie, Pa.

**VISES, Woodworkers'—**
Massey Vise Co., Chicago, Ill.
Wyman & Gordon, Worcester, Mass.

**VITRIOL, Blue—**
American Steel & Wire Co., Chicago, Ill.
United Metals Selling Co., 11 Broadway, New York.

**VOLT METERS—See Meters, Recording Volt.**

**WADS, Gun—**
Peters Cartridge Co., Cincinnati, O.
Union Metallic Cartridge Co., 313-315 Broadway, New York.

**WAFFLE IRONS—See Irons, Waffle.**

**WAGON AND CARRIAGE MACHINERY—**
Defiance Machine Works, Defiance, O.
J. A. Fay & Co., Cincinnati, O.
Williams, White & Co., Moline, Ill.

**WAGON AXLES, CHAINS, &c.—See Axles, Chains, &c.**

**WAGONS, Delivery—**
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

**WAGONS, Dump—**
Kilbourne & Jacobs Mfg. Co., Columbus, O.

**WAGONS, Farm, &c.—**
Electric Wheel Co., Quincy, Ill.

**WAGONS, MOTOR—See Carriages.**

**WAGON TANKS—See Tanks, Wagon, Oil, and Sprinkling.**

**WAGON WHEEL MACHINES—See Wheel Machines, Wagon.**

**WAITERS, Dumb—**
Energy Elevator Co., Philadelphia, Pa.
Morse, Williams & Co., Philadelphia, Pa.
J. G. Speidel, Reading, Pa.
Storm Mfg. Co., Newark, N. J.
Variety Machine Co., Warsaw, N. Y.
Warner Elevator Mfg. Co., Cincinnati, O.

**WAITERS, Silver Plated—**
International Silver Co., 9-13 Maiden Lane, New York.

**WALK SCRAPERS—See Scrapers, Walk and Street.**

**WALL SCRAPERS—See Scrapers.**

**WARDROBE HOOKS—See Hooks, Coat, Hat, &c.**

**WARDROBES, OFFICE AND SHOP—See Lockers.**

**WARE, Aluminum—**
Norton Mfg. Co., Chester, Ct.
Sidney Shepard & Co., Buffalo, N. Y.

**WARE, Copper—**
Sidney Shepard & Co., Buffalo, N. Y.

**WARE, Decorated, Metal Mounted—**
M. S. Benedict Mfg. Co., East Syracuse, N.Y.

**WARE, Enameled—**
Cleveland Stamping & Tool Co., Cleveland.
Keen & Hagerty Mfg. Co., Baltimore, Md.

**WARE, Hollow, Silver and Silver Plated—**
M. S. Benedict Mfg. Co., East Syracuse, N.Y.
International Silver Co., 9-13 Maiden Lane, New York.
Simeon L. & Geo. H. Rogers Co., Hartford, Ct.

**WARE, Hollow, Steel—**
Avery Stamping Co., Cleveland, O.
Cleveland Stamping & Tool Co., Cleveland.
Keen & Hagerty Mfg. Co., Baltimore, Md.

**WAREHOUSE BASKETS—See Wheelers.**

**WAREHOUSE TRUCKS—See Trucks, Store, Warehouse, &c.**

**WARE, Sheet Iron—**
Keen & Hagerty Mfg. Co., Baltimore, Md.
Sidney Shepard & Co., Buffalo, N. Y.

**WARE, TIN—See Tinware.**

**WARE, Wooden—**
Hill Dryer Co., Worcester, Mass.

**WARM AIR FURNACES—See Furnaces, Warm Air.**

**WARMERS, Plate, Pie, Cake, &c.—**
V. Clad & Sons, Philadelphia, Pa.

**WASH BENCHES, STANDS—See Stands and Benches, Tub.**

**WASHBOARD BLANKS—**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.

**WASHBOARD KNIVES—See Knives, Machine.**

**WASHBOARDS—**
Lloyd Mfg. Co., Minneapolis, Minn.
Saginaw Mfg. Co., Saginaw, Mich.

**WASHER CUTTERS—See Cutters, Washer.**

**WASHER MACHINES—**
National Machinery Co., Tiffin, O.

**WASHER PUNCHES—See Punches, Washer.**

**WASHERS AND DISKS, Rubber—See Gaskets and Rings, Rubber.**

**WASHERS AND STREET HYDRANT—See Hydrants and Street Washers**

**WASHERS, Brass—**
American Hardware Mfg. Co., Ottawa, Ill.
Wm. H. Haskell Mfg. Co., Pawtucket, R. I.
Wilson & Smith, Worcester, Mass.

**WASHERS, Cast—**
American Iron & Steel Mfg. Co., Lebanon, Pa.
Bethlehem Foundry & Machine Co., South Bethlehem, Pa.
Wm. H. Haskell Mfg. Co. Pawtucket, R. I.
John C. Kupferle, St. Louis, Mo.
Henry B. Newhall, 26 Cortlandt St., N. Y.
Pleuger & Henger Mfg. Co., St. Louis, Mo.
Port Chester Bolt & Nut Co., Port Chester, N. Y.
Republic Iron & Steel Co., Chicago, Ill.
Rockford Bolt Works, Rockford, Ill.
Stover Mfg. Co., Freeport, Ill.
Wilson & Smith, Worcester, Mass.

**WASHERS, FLOOR—See Plates and Washers, Floor.**

**WASHERS, Lead—**
Wilson & Smith, Worcester, Mass.

**WASHERS, Leather—**
Barnes Mfg. Co., Mansfield, O.
W. J. Clark Co., Salem, O.
Raymond Mfg. Co., Corry, Pa.

**WASHERS, Prop Block—**
McKinnon Dash Co., Buffalo, N. Y.

**WASHERS, Wrought—**
American Hardware Mfg. Co., Ottawa, Ill.
American Iron & Steel Mfg. Co., Lebanon, Pa.
Avery Stamping Co., Cleveland, O.
Cincinnati Screw & Tap Co., Cincinnati, O.
W. J. Clark Co., Salem, O.
Clark & Cowles, Plainville, Ct.
Enterprise Foundry Co., Cincinnati, O.
Grand Crossing Tack Co., Chicago, Ill.
Griffin Mfg. Co., Allegheny, Pa.
Sam'l Hall's Sons, 229-233 W. 10th St., New York.
Wm. H. Haskell Mfg. Co. Pawtucket, R. I.
Jenkins Bros., 71 John St., New York.
M. Lanz & Sons, Pittsburgh, Pa.
McKinney Mfg. Co., Allegheny, Pa.
Milton Mfg. Co., Milton, Pa.
Nut & Washer Mfg. Co., Milwaukee, Wis.
Plymouth Mills, Plymouth, Mass.
Port Chester Bolt & Nut Co., Port Chester, N. Y.
Republic Iron & Steel Co., Chicago, Ill.
Rhode Island Tool Co., Providence, R. I.
Rockford Bolt Works, Rockford, Ill.
Shelton Co., Derby, Ct.
Stanley Works, New Britain, Ct.
Wheeling Hinge Co., Wheeling, W. Va.
Wilcox, Crittenden & Co., Middletown, Ct.
Wilson & Smith, Worcester, Mass.

**WASHING AND SEPARATING MACHINERY, Ore—**
Aultman Co., Canton, O.
Jeffrey Mfg. Co., Columbus, O.

**WASHING MACHINERY, COAL—See Coal Washing Machinery.**

**WASHING MACHINES—**
American Mfg. Co., Lockland, O.
N. C. Baughman, York, Pa.
Bluffton Mfg. Co., Bluffton, Ind.
Boss Washing Machine Co., Cincinnati, O.
H. F. Brammer Mfg. Co., Davenport, Ia.
Clark, Quien & Morse, Peoria, Ill.
Anthony Wayne Mfg. Co., Fort Wayne, Ind.

**WASTE BASKETS, CANS—See Baskets, Cans.**

**WASTE BOXES, CAST IRON—See Boxes, Cast Iron Waste.**

**WASTE, COTTON—**
A. Leschen & Sons Rope Co., St. Louis, Mo.
Railway Supply Co., St. Louis, Mo.

**WATCH CASES—See Cases, Watch.**

**WATCHMAKERS' SUPPLIES—See Jobbers', Watchmakers' Supplies.**

**WATCHMEN'S CLOCKS—See Clocks, Watchmen's.**

**WATER CLOSET HINGES—See Hinges, Water Closet Seat.**

**WATER COOLERS, ELEVATORS, &c.—See Coolers, Elevators, &c.**

**WATERERS, STOCK—See Stock Waterers.**

**WATER PIPE, RIVETED—See Pipe, Riveted Steel.**

**WATER WHEELS—**
W. J. Clark Co., Salem, O.
Dubuque Machine Concern, Dubuque, Iowa.
James Leffel & Co., Springfield, O.
R. Poole & Son Co., Baltimore, Md.
Craig Ridgway & Son Co., Coatesville, Pa.
R. D. Wood & Co., Philadelphia, Pa.

**WATER WORKS SUPPLIES—**
Ingersoll-Sergeant Drill Co., 26 Cortlandt St., New York.
McKiernan Drill Co., 120 Liberty St., New York.
Charles Millar & Son, Utica, N. Y.
Pleuger & Henger Mfg. Co., St. Louis, Mo.

**WATT METERS, RECORDING—See Meters, Recording Watt.**

**WAX, Fruit Can—**
Markle Lead Works, St. Louis, Mo.

**WAX MELTING CUPS—See Cups, Wax Melting.**

**WEATHERPROOF WIRE—See Wires, Electrical.**

**WEAVING MACHINERY, Wire Mattress—**
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.

**WEAVING MACHINES, Rattan—**
Chas. Leffler & Co., Brooklyn, N. Y.

**WEB GIRTS, HALTERS—See Girts, Halters.**

**WEBS, Turning, Felloe, &c.—**
E. C. Atkins & Co., Indianapolis, Ind.
Henry Disston & Sons, Philadelphia, Pa.
C. E. Jennings Co., 101 Reade St., N. Y.
Millers Falls Co., 28 Warren St., N. Y.
National Saw Co., Newark, N. J.
Simonds Mfg. Co., Fitchburg, Mass.

**WEDGES, Axe—**
Walter W. Woodruff & Sons Co., Mount Carmel, Pa.

**WEDGES, Granite—**
Hawkridge Bros., Boston, Mass.

**WEDGES, Wood Choppers'—**
Cape Ann Tool Co., Pigeon Cove, Mass.

**WEEDERS, Garden—**
Arcade Mfg. Co., Freeport, Ill.
W. J. Clark Co., Salem, O.
Iowa Farming Tool Co., Fort Madison, Ia.
Terre Haute Shovel & Tool Co., Terre Haute, Ind.

**WEEDING HOOKS—See Hooks, Weeding.**

**WEIGHING MACHINES, Automatic, for Granular Materials—**
Pratt & Whitney Co., Hartford, Ct.

**WEIGHTS, Hitching—**
Covert Mfg. Co., West Troy, N. Y.
Covert's Saddlery Works, Farmer, N. Y.
Imperial Bit & Snap Co., Racine, Wis.
John C. Kupferle, St. Louis, Mo.
Logan & Strobridge Iron Co., New Brighton, Pa.
Pleuger & Henger Mfg. Co., St. Louis, Mo.

**WEIGHTS, Paper—**
Wrightsville Hardware Co., Wrightsville, Pa.

**WEIGHTS, Sash—**
Allston Foundry Co., Boston, Mass.
Barney & Reed Mfg. Co., Boston, Mass.
E. E. Brown & Co., Philadelphia, Pa.
Enterprise Foundry Co., Cincinnati, O.
C. Hanika & Sons, Celina, O.
John C. Kupferle, St. Louis, Mo.

**WEIGHTS, SCALE—See Scale Manufacturers.**

**WEIGHTS, Test—**
Standard Scale & Supply Co., Pittsburgh.

**WELDING, Electric—**
Standard Welding Co., Cleveland, O.

**WELDING MACHINES, Tire—**
Long & Allstatter Co., Hamilton, O.
Williams, White & Co., Moline, Ill.

**WELL CHAINS, CURBS, &c.—See Chains, Curbs, &c.**

**WELL MACHINERY—**
Dubuque Machine Concern, Dubuque, Iowa.
Flint & Walling Mfg. Co., Kendallville, Ind.

**WELL SUPPLIES AND TOOLS (Points, Cylinders, Valves, Tubular Well Tools, &c.)—**
Barnes Mfg. Co., Mansfield, O.
A. D. Cook, Lawrenceburg, Ind.
Crane Co., Chicago, Ill.
Deming Co., Salem, O.
Dubuque Machine Concern, Dubuque, Iowa.
Stanley G. Flagg & Co., Philadelphia, Pa.
Flint & Walling Mfg. Co., Kendallville, Ind.
Goulds Mfg. Co., Seneca Falls, N. Y.
Jarecki Mfg. Co., Erie, Pa.
Jenkins Bros., 71 John St., New York.
F. E. Myers & Bro., Ashland, O.
Union Mfg. Co., New Britain, Ct.

**WHARF SPIKES—See Spikes, Dock, Wharf, &c.**

**WHEELBARROWS—**
Osborn Mfg. Co., Cleveland, O.
See also *Barrows, Wheel.*

**WHEEL CUTTERS, Clock—**
Cross & Speirs Machine Co., Waterbury, Ct.

**WHEELERS—**
Crane Bros., Westfield, Mass.

**WHEEL MOLDING MACHINES, CAR—See Molding Machines, Car Wheel.**

**WHEEL MACHINES, Wagon—**
Defiance Machine Works, Defiance, O.

**WHEEL PRESSES, CAR—See Presses, Car Wheel.**

**WHEELS—See Axles and Wheels.**

**WHEELS, Balance.**
Jones & Laughlins, Ltd., Pittsburgh, Pa.

**WHEELS, Ball Bearing—**
Atlas Bolt & Screw Co., Cleveland, O.
McCabe Hanger Mfg. Co., 532-542 W. 22d St., New York.

**WHEELS, Barrow—**
Electric Wheel Co., Quincy, Ill.
Havana Metal Wheel Co., Havana, Ill.
Kilbourne & Jacobs Mfg. Co., Columbus, O.
Sidney Steel Scraper Co., Sidney, O.
West Side Foundry Co., Troy, N. Y.

**WHEELS, Car—**
American Engineering Works, Chicago, Ill.
Atlas Bolt & Screw Co., Cleveland, O.
Braddock Machine & Mfg. Co., Braddock, Pa.
Edw. J. Etting, Philadelphia, Pa.
Ferro-Carbon Castings Co., Philadelphia.
Keagy & Lear Machine Co., Coshocton, O.
Henry Levis & Co., Philadelphia, Pa.
Pierson & Co., 29 Broadway, New York.
Ramapo Car Wheel Co., Ramapo, N. Y.

**WHEELS, Carborundum—**
Carborundum Co., Niagara Falls, N. Y.
Chicago Wheel & Mfg. Co., Chicago, Ill.

**WHEELS, Caster, Soft Rubber—**
M. B. Schenck Co., Meriden, Ct.

**WHEELS, CHILLED CAR—See Car Wheels, Chilled.**

**WHEELS, Clock—**
Reeves Mfg. Co., New Haven, Ct.

**WHEELS, Corundum—**
Bridgeport Safety Emery Wheel Co., Bridgeport, Ct.
Chicago Wheel & Mfg. Co., Chicago, Ill.
Northampton Emery Wheel Co., Leeds, Mass.
Star Corundum Wheel Co., Detroit, Mich.
Sterling Emery Wheel Mfg. Co., Tiffin, O.
Vitrified Emery Wheel Co., Westfield, Mass.

**WHEELS, Dental—**
Chicago Wheel & Mfg. Co., Chicago, Ill.
Pike Mfg. Co., Pike Station, N. H.

**WHEELS, Emery—**
American Emery Wheel Works, Boston.
Bridgeport Safety Emery Wheel Co., Bridgeport, Ct.
Builders Iron Foundry, Providence, R. I.
Chicago Wheel & Mfg. Co., Chicago, Ill.
Diamond Machine Co., Providence, R. I.
Northampton Emery Wheel Co., Leeds, Mass.
Norton Emery Wheel Co., Worcester, Mass.
Safety Emery Wheel Co., Springfield, O.
Springfield Mfg. Co., Bridgeport, Ct.
Star Corundum Wheel Co., Detroit, Mich.
Sterling Emery Wheel Mfg. Co., Tiffin, O.
Tanite Co., Stroudsburg, Pa.
Vitrified Wheel Co., Westfield, Mass.

**WHEELS, Fifth—**
E. D. Clapp Mfg. Co., Auburn, N. Y.
Richard Eccles, Auburn, N. Y.
Scranton Forging Co., Scranton, Pa.
M. Seward & Son Co., New Haven, Ct.
D. Wilcox Mfg. Co., Mechanicsburg, Pa.

**WHEELS, Grinding, for Sewing Machines—**

**WHEELS, Measuring, Tire—**
Wells Bros. Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

**WHEELS, Polishing—**
Bridgeport Safety Emery Wheel Co., Bridgeport, Ct.
Chicago Wheel & Mfg. Co., Chicago, Ill.
Diamond Machine Co., Providence, R. I.
Divine Bros. Co., Utica, N. Y.
Hanson & Van Winkle Co., Newark, N. J.
Northampton Emery Wheel Co., Leeds, Mass.
Norton Emery Wheel Co., Worcester, Mass.
Osborn Mfg. Co., Cleveland, O.
Perry Ransom, Oshkosh, Wis.
Springfield Mfg. Co., Bridgeport, Ct.
Sterling Emery Wheel Mfg. Co., Tiffin, O.
Vitrified Wheel Co., Westfield, Mass.
Zucker & Levett & Loeb Co., 526-530 West 25th St., New York.

**WHEELS, Roller Bearing—**
American Roller Bearing Co., Boston, Mass.

**WHEELS, Roll Grinding—**
Carborundum Co., Niagara Falls, N. Y.
Vitrified Wheel Co., Westfield, Mass.

**WHEELS, Rubber Tired—**
Kilbourne & Jacobs Mfg. Co., Columbus, O.

**WHEELS, Sprocket—**
Aultman Co., Canton, O.
C. O. Bartlett & Co., Cleveland, O.
Bethlehem Foundry & Machine Co., South Bethlehem, Pa.
Boston Gear Works, Boston, Mass.
Buhl Malleable Co., Detroit, Mich.
Geo. V. Cresson Co., Philadelphia, Pa.
Fairmount Machine Co., Philadelphia, Pa.
Filer & Stowell Co., Milwaukee, Wis.
Heyl & Patterson, Pittsburgh, Pa.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Engineering Co., Philadelphia.
Henry B. Newhall, 26 Cortlandt St., N. Y.
Weaver-Hirsh Co., Allentown, Pa.
T. F. Welch Mfg. Co., Boston, Mass.
Wickes Bros., Saginaw, Mich.

**WHEELS, Steam Valve—**
Sawyer Tool Co., Fitchburg, Mass.
Troy Nickel Works, Albany, N. Y.

**WHEELS, Steering, for Vessels—**
Barnes Tool Co., New Haven, Ct.

**WHEELS, Tracing—**
Arcade Mfg. Co., Freeport, Ill.
Billings & Spencer Co., Hartford, Ct.

**WHEELS, Truck—**
Wm. Bayley & Sons Co., Milwaukee, Wis.
Braddock Machine & Mfg. Co., Braddock, Pa.
Havana Metal Wheel Co., Havana, Ill.
Kilbourne & Jacobs Mfg. Co., Columbus, O.
R. W. Whitehurst & Co., Norfolk, Va.

**WHEELS, Vehicle—**
Electric Wheel Co., Quincy, Ill.
Havana Metal Wheel Co., Havana, Ill.
Heartley Machine, Variety Iron & Tool Works, Toledo, O.

**WHEELS, WATER—See Water Wheels.**

**WHEELS, Well—**
John C. Kupferle, St. Louis, Mo.
Peck, Stow & Wilcox Co., 27 Murray St., New York.
Pleuger & Henger Mfg. Co., St. Louis, Mo.
Reading Hardware Co., Reading, Pa.
Wrightsville Hardware Co., Wrightsville, Pa.

**WHIP SOCKETS—See Sockets, Whip.**

**WHISK BROOMS, &c.—See Brooms, Whisk, &c.**

**WHISTLE CORD HOOKS—See Hooks, Whistle Cord.**

**WHISTLES, Alarm—**
Crane Co., Chicago, Ill.
Lunkenheimer Company, Cincinnati, O.
W. R. Ostrander & Co., 22 Dey St., N. Y.

**WHISTLES, Steam—**
Ashton Valve Co., Boston, Mass.
Crane Co., Chicago, Ill.
Lunkenheimer Company, Cincinnati, O.
McNab & Harlin Mfg. Co., 56 John St., New York.
Wickes Bros., Saginaw, Mich.

**WHITE BRASS—See Brass, White.**

**WHITE LEAD MACHINERY—**
J. B. & J. M. Cornell, 26th St. & 11th Ave., New York.
Geo. V. Cresson Co., Philadelphia, Pa.
R. Poole & Son Co., Baltimore, Md.

**WHITEWASH BRUSHES—See Brushes, Whitewash, Horse, &c.**

**WICK, Candle—**
A. Leschen & Sons Rope Co., St. Louis, Mo.

**WICKETS, RAILING—See Iron, Ornamental.**

**WINCHES—**
Edson Mfg. Co., Boston, Mass.
Jos. F. McCoy Co., 26 Warren St., New York.

**WINDING MACHINES—**
Fairmount Machine Co., Philadelphia, Pa.

**WINDING MACHINES, BOBBIN—See Bobbin Winding Machines.**

**WINDLASSES—**
Thos. Carlin's Sons, Allegheny, Pa.
Edson Mfg. Co., Boston, Mass.
Jos. F. McCoy Co., 26 Warren St., New York.

**WIND MILL PUMPS, REGULATORS, TANKS—See Pumps, Regulators, Tanks.**

**WIND MILLS—See Mills, Wind.**

**WINDOW ANTI-RATTLERS, BRUSHES, &c.—See Anti-Rattlers, Brushes, &c.**

**WINDOW CAPS—See Caps, Door and Window, Sheet Iron.**

**WINDOW FIXTURES, Revolving—**
New Century Mfg. Co., 79 East 130th St., New York.

**WINDOW SCREEN FASTENERS, FRAMES—See Fasteners, Frames.**

**WINDOW SCREENS—See Screens, Window.**

**WINDOWS, Fire Proof—**
Smith-Warren Co., East Cambridge, Mass.
E. Van Noorden Co., Boston, Mass.

**WINDOW SPRING BOLTS—See Bolts, Window Spring.**

**WINDOWS, Reversible—**
Phenix Mfg. Co., Milwaukee, Wis.

**WINDOW STOP ADJUSTERS—See Adjusters, Window Stop.**

**WINDOW VENTILATING BOLTS—See Bolts, Window Ventilating.**

**WINE PITCHERS—See Pitchers, Silver Plated.**

**WINSHURST ELECTRICAL MACHINES—See Electrical Machines, Static.**

**WIRE, Aluminum—**
American Steel & Wire Co., Chicago, Ill.
Pittsburgh Reduction Co., Pittsburgh, Pa.
Scovill Mfg. Co., Waterbury, Ct.

**WIRE, Awl—**
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.

**WIRE, Baling—**
American Steel & Wire Co., Chicago, Ill.
Dillon-Griswold Wire Co., Sterling, Ill.
Grand Crossing Tack Co., Grand Crossing, Ill.
Morgan Spring Co., Worcester, Mass.

**WIRE, Barb—**
American Steel & Wire Co., Chicago, Ill.
Dillon-Griswold Wire Co., Sterling, Ill.
Ludlow-Saylor Wire Co., St. Louis, Mo.

**WIRE BASKET HANDLES—See Handles, Basket, Wire.**

**WIRE, Bicycle Spoke—**
American Steel & Wire Co., Chicago, Ill.
Morgan Spring Co., Worcester, Mass.
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRE, Bolt—**
American Steel & Wire Co., Chicago, Ill.
Morgan Spring Co., Worcester, Mass.
Spencer Wire Co., Worcester, Mass.

**WIRE, Bottling, Book Binder, &c.—**
American Steel & Wire Co., Chicago, Ill.
Spencer Wire Co., Worcester, Mass.

**WIRE, Brass and Copper—**
American Steel & Wire Co., Chicago, Ill.
Ansonia Brass & Copper Co., 99 John St., New York.
Bridgeport Brass Co., Bridgeport, Ct.
Hazard Mfg. Co., Wilkes-Barre, Pa.
Hendricks Bros., 45 Cliff St., New York.
U. T. Hungerford Brass & Copper Co., 121 Worth St., New York.
Macomber & Whyte Rope Co., Chicago, Ill.
Merchant & Co., Philadelphia, Pa.
Michigan Wire Cloth Co., Detroit, Mich.
Plume & Atwood Mfg. Co., Waterbury, Ct.
Randolph-Clowes Co., Waterbury, Ct.
Arthur T. Rutter, 256 Broadway, N. Y.
Scovill Mfg. Co., Waterbury, Ct.
Spencer Wire Co., Worcester, Mass.
United Metals Selling Co., 11 Broadway, New York.
Waterbury Brass Co., Waterbury, Ct.
Wright & Colton Wire Cloth Co., Worcester, Mass.

**WIRE, Brass Pinion—**
Ansonia Brass & Copper Co., 99 John St., New York.
Boston Gear Works, Boston, Mass.
Merchant & Co., Philadelphia, Pa.

**WIRE, Broom and Brush—**
Summit Wire Co., Cuyahoga Falls, O.

**WIRE BRUSHES—See Brushes, Wire.**

**WIRE, Card—**
American Steel & Wire Co., Chicago, Ill.
Spencer Wire Co., Worcester, Mass.

**WIRE, Cast Steel—**
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRE, Check Rower—**
American Steel & Wire Co., Chicago, Ill.

**WIRE CHISELS, COILERS, &c.—See Chisels, Coilers, &c.**

**WIRE, Clock Spring—**
American Steel & Wire Co., Chicago, Ill.
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRE CLOTH—See Cloth.**

**WIRE CLOTH FLOORS, HOLDERS—See Floors, Holders.**

**WIRE, Cord—**
American Steel & Wire Co., Chicago, Ill.

**WIRE, Cotter—**
American Steel & Wire Co., Chicago, Ill.

**WIRE CUTTING MACHINES—See Cutting Machines, Wire.**

**WIRE, Dental—**
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.

**WIRE DRAW BENCHES—See Draw Benches, Wire.**

**WIRE, Flat—**
American Steel & Wire Co., Chicago, Ill.
Miller & Van Winkle, Brooklyn, N. Y.
Spencer Wire Co., Worcester, Mass.
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRE FLATTENING MILLS—**
Waterbury Farrel Foundry & Machine Co., Waterbury, Ct.
Blake & Johnson, Waterbury, Ct.

**WIRE, Florists'—**
American Steel & Wire Co., Chicago, Ill.
Spencer Wire Co., Worcester, Mass.

**WIRE FUSE—See Fuse, Wire.**

**WIRE, German Silver—**
Merchant & Co., Philadelphia, Pa.
Scovill Mfg. Co., Waterbury, Ct.
Waterbury Brass Co., Waterbury, Ct.

**WIRE, Gimlet—**
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.

**WIRE GOODS, Bright—**
American Steel & Wire Co., Chicago, Ill.
Blake & Johnson, Waterbury, Ct.
M. S. Brooks & Sons, Chester, Ct.
E. Jenckes Mfg. Co., Pawtucket, R. I.
Ossawan Mills Co., Norwich, Ct.
Wire Goods Co., Worcester, Mass.

**WIRE GOODS, Mill—**
M. S. Brooks & Sons, Chester, Ct.
E. Jenckes Mfg. Co., Pawtucket, R. I.
Wire Goods Co., Worcester, Mass.

**WIRE GOODS, to order—**
Blake & Johnson, Waterbury, Ct.
R. C. Jenkinson & Co., Newark, N. J.
E. Jenckes Mfg. Co., Pawtucket, R. I.
Wire Goods Co., Worcester, Mass.

**WIRE, Heddle—**
American Steel & Wire Co., Chicago, Ill.
Cleveland Wire Spring Co., Cleveland, O.
National Wire Corp., New Haven, Ct.
Spencer Wire Co., Worcester, Mass.

**WIRE, Iron and Steel, Market, Fence, Stone, &c.—**
American Steel & Wire Co., Chicago, Ill.
Dillon-Griswold Wire Co., Sterling, Ill.
Frost Wire Fence Co., Cleveland, O.
Grand Crossing Tack Co., Grand Crossing, Ill.
Kilmer Mfg. Co., Chicago, Ill.
Macomber & Whyte Rope Co., Chicago, Ill.
Merchant & Co., Philadelphia, Pa.
Michigan Wire Cloth Co., Detroit, Mich.
Morgan Spring Co., Worcester, Mass.
National Wire Corp., New Haven, Ct.
Geo. W. Prentiss & Co., Holyoke, Mass.
Reading Screw Co., Norristown, Pa.
Spencer Wire Co., Worcester, Mass.
Stewart Wire Co., Easton, Pa.
Summit Wire Co., Cuyahoga Falls, O.
C. E. & E. P. Townsend, New Brighton, Pa.
Trenton Iron Co., Trenton, N. J.
R. H. Wolff & Co., Foot 116th St., N. Y.
Wright & Colton Wire Cloth Co., Worcester, Mass.

**WIRE KITCHEN ARTICLES—See Kitchen Articles, Wire.**

**WIRE, Knurled—**
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.

**WIRE, Lock, Hat, Brush and Curtain—**
National Wire Corp., New Haven, Ct.
Spencer Wire Co., Worcester, Mass.
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRE, Mattress—**
American Steel & Wire Co., Chicago, Ill.
Spencer Wire Co., Worcester, Mass.
Summit Wire Co., Cuyahoga Falls, O.

**WIRE MILL PLANTS—**
Braddock Machine & Mfg. Co., Braddock, Pa.
Garrett-Cromwell Engineering Co., Cleveland, O.
Morgan Construction Co., Worcester, Mass.
Stanyan-Miller Engineering Co., Pittsburgh, Pa.
Hugh L. Thompson, Waterbury, Ct.
Turner, Vaughn & Taylor Co., Cuyahoga Falls, O.
Waterbury Farrel Foundry & Machine Co., Waterbury, Ct.

**WIRE, Music—**
American Steel & Wire Co., Chicago, Ill.
Trenton Iron Co., Trenton, N. J.
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRE, Needle—**
American Steel & Wire Co., Chicago, Ill.
Hobson, Houghton & Co., 98 John St., New York.
Jonas & Colver Continental Steel Works, 101 Duane St., New York.
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.
R. H. Wolff & Co., Foot 116th St., N. Y.
Wheelock, Lovejoy & Co., 23 Cliff St., N. Y.

**WIRE NETTING RACKS—See Racks, Wire Netting.**

**WIRE, Picture—**
National Wire Corp., New Haven, Ct.
Phosphor Bronze Smelting Co., Philadelphia, Pa.
Spencer Wire Co., Worcester, Mass.
See also *Cord, Wire, Picture.*

**WIRE, Pin—**
American Steel & Wire Co., Chicago, Ill.
Morgan Spring Co., Worcester, Mass.
National Wire Corp., New Haven, Ct.

**WIRE, Reed—**
American Steel & Wire Co., Chicago, Ill.
Spencer Wire Co., Worcester, Mass.

**WIRE, Rivet—**
American Steel & Wire Co., Chicago, Ill.
Morgan Spring Co., Worcester, Mass.
National Wire Corp., New Haven, Ct.
Spencer Wire Co., Worcester, Mass.

**WIRE ROD REELS—See Reels, Wire Rod.**

**WIRE RODS—See Rods, Wire.**

**WIRE, Rope—**
Carlin Machine & Supply Co., Allegheny, Pa.
A. Leschen & Sons Rope Co., St. Louis, Mo.
Spencer Wire Co., Worcester, Mass.
R. H. Wolff & Co., Foot 116th St., N. Y.
See *Rope, Wire.*

**WIRE ROPE CLAMPS, CLIPS, &c.—See Clamps, Clips, &c.**

**WIRE, Round, Tempered—**
American Steel & Wire Co., Chicago, Ill.
Miller & Van Winkle, Brooklyn, N. Y.
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRES, Bailing—**
Spencer Wire Co., Worcester, Mass.

**WIRE, Screw—**
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.
Morgan Spring Co., Worcester, Mass.
Spencer Wire Co., Worcester, Mass.

**WIRE, Screw Driver—**
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.

**WIRES, Electrical—**
American Steel & Wire Co., Chicago, Ill.
Ansonia Brass & Copper Co., 99 John St., New York.
Bridgeport Brass Co., Bridgeport, Ct.
General Electric Co., Schenectady, N. Y.
Hazard Mfg. Co., Wilkes-Barre, Pa.
Hendricks Bros., 49 Cliff St., New York.
U. T. Hungerford Brass & Copper Co., 121 Worth St., New York.
A. Leschen & Sons Rope Co., St. Louis, Mo.
Macomber & Whyte Rope Co., Chicago, Ill.
Merchant & Co., Philadelphia, Pa.
Phosphor Bronze Smelting Co., Philadelphia, Pa.
Plume & Atwood Co., 29 Murray St., N. Y.
Randolph-Clowes Co., Waterbury, Ct.
Arthur T. Rutter, 256 Broadway, N. Y.
Scovill Mfg. Co., Waterbury, Ct.
United Metals Selling Co., 11 Broadway, New York.
Waterbury Brass Co., Waterbury, Ct.
Wright & Colton Wire Cloth Co., Worcester, Mass.

**WIRE SHAPES TO ORDER—**
Clark & Cowles, Plainville, Ct.
R. C. Jenkinson & Co., Newark, N. J.
Morgan Spring Co., Worcester, Mass.
Raymond Mfg. Co., Corry, Pa.
E. H. Titchener & Co., Binghamton, N. Y.
C. T. Williamson Co., Newark, N. J.

**WIRE, Soft, Coppered, Bright and Annealed—**
American Steel & Wire Co., Chicago, Ill.
Merchant & Co., Philadelphia, Pa.
Morgan Spring Co., Worcester, Mass.
National Wire Corp., New Haven, Ct.

**WIRE, Special—**
American Steel & Wire Co., Chicago, Ill.
Bridgeport Brass Co., Bridgeport, Ct.
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.
Merchant & Co., Philadelphia, Pa.
Morgan Spring Co., Worcester, Mass.
National Wire Corp., New Haven, Ct.
Phosphor Bronze Smelting Co., Philadelphia, Pa.
Geo. W. Prentiss & Co., Holyoke, Mass.
Spencer Wire Co., Worcester, Mass.
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRE, Spooled—**
American Steel & Wire Co., Chicago, Ill.
Ansonia Brass & Copper Co., 99 John St., New York.
Malin & Co., Cleveland, O.
Ossawan Mills Co., Norwich, Ct.
Spencer Wire Co., Worcester, Mass.
Wire Goods Co., Worcester, Mass.
Wright & Colton Wire Cloth Co., Worcester, Mass.

**WIRE, Spring—**
American Steel & Wire Co., Chicago, Ill.
Cleveland Wire Spring Co., Cleveland, O.
Morgan Spring Co., Worcester, Mass.
National Wire Corp., New Haven, Ct.
Spencer Wire Co., Worcester, Mass.

**WIRES, Tempered, Cast Steel—**
American Steel & Wire Co., Chicago, Ill.
Cleveland Wire Spring Co., Cleveland, O.
Miller & Van Winkle, Brooklyn, N. Y.
Morgan Spring Co., Worcester, Mass.

**WIRE STITCHING MACHINES—**
R. H. Brown & Co., New Haven, Ct.

**WIRE STRAIGHTENING AND CUTTING MACHINES—See Straightening and Cutting Machines, Wire.**

**WIRE, Strand, Guy, Galvanized—**
American Steel & Wire Co., Chicago, Ill.
A. Leschen & Sons Rope Co., St. Louis, Mo.
Macomber & Whyte Rope Co., Chicago, Ill.

**WIRE, Tack—**
American Steel & Wire Co., Chicago, Ill.

**WIRE, Tape Line—**
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRE TRAYS, PAPER—See Trays, Wire, Paper.**

**WIRE, Umbrella—**
American Steel & Wire Co., Chicago, Ill.
National Wire Corp., New Haven, Ct.
R. H. Wolff & Co., Foot 116th St., N. Y.

**WIRE, Watch—**
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.

**WIRE WEAVING—**
American Steel & Wire Co., Chicago, Ill.
Spencer Wire Co., Worcester, Mass.

**WIRE WINDOW GUARDS—See Guards, Wire Window.**

**WIRE, Wood Bit—**
Kidd Bros. & Burgher Steel Wire Co., McKee's Rocks, Pa.

**WIRE WORK, to order—**
E. T. Barnum, Detroit, Mich.
Blake & Johnson, Waterbury, Ct.
Edward Darby & Sons, Philadelphia, Pa.
Forest City Steel & Iron Co., Cleveland, O.
Howard & Morse, 45 Fulton St., New York.
R. C. Jenkinson & Co., Newark, N. J.
Ludlow-Saylor Wire Co., St. Louis, Mo.
Fred. J. Meyers Mfg. Co., Hamilton, O.
Michigan Wire Cloth Co., Detroit, Mich.
Scheeler's Sons, Buffalo, N. Y.
Van Dorn Iron Works Co., Cleveland, O.

**WOOD ENGRAVING—See Engraving, Photo and Wood.**

**WOODEN MALLETS, SCOOPS, SHOVELS—See Mallets, Scoops, Shovels.**

**WOODEN SPECIALTIES—**
John Sommer's Son, Newark, N. J.

**WOODEN WARE—See Ware, Wooden.**

**WOOD FAUCETS, MEASURES, &c.—See Faucets, Measures, &c.**

**WOOD SAWING MACHINES—See Sawing Machines, Wood.**

**WOODS, ELECTRIC—See Electric Woods.**

**WOOD TURNERS' TOOLS—See Tools, Wood Turners'.**

**WOOD TURNINGS—See Turnings, Wood, to Order.**

**WOOD WORKERS, Universal—**
Egan Co., Cincinnati, O.

**WOOD WORKING MACHINES—**
American Machinery Co., Grand Rapids, Mich.
A. F. Bartlett & Co., Saginaw, E. S., Mich.
Carlin Machinery & Supply Co., Allegheny, Pa.
C. H. Cowdrey Machine Works, Fitchburg, Mass.
Defiance Machine Co., Defiance, O.
Egan Co., Cincinnati, O.
Fox Machine Co., Grand Rapids, Mich.
Niles Tool Works Co., Hamilton, O.
Paradox Machinery Co., Chicago, Ill.
Pennsylvania Machine Co., Philadelphia, Pa.
Seneca Falls Mfg. Co., Seneca Falls, N. Y.
Frank Toomey, Philadelphia, Pa.
Wickes Bros., Saginaw, Mich.
Williams, White & Co., Moline, Ill.
S. A. Woods Machine Co., So. Boston, Mass.

**WORK BENCHES—See Benches, Work.**

**WORM GEARING—**
J. B. & J. M. Cornell, 26th St. & 11th Ave., New York.
Geo. V. Cresson Co., Philadelphia, Pa.
Robert Poole & Son Co., Baltimore, Md.

**WRAPPING PAPER HOLDERS AND CUTTERS—See Holders and Cutters, Roll Paper.**

**WRECKING MACHINERY, Railroad—**
Vulcan Iron Works, Chicago, Ill.

**WRENCH ATTACHMENTS, Pipe—**
Prentiss Vise Co., 44 Barclay St., N. Y.
Star Mfg. Co., Carpentersville, Ill.
L. S. Starrett Co., Athol, Mass.

**WRENCH MACHINERY—**
Gould & Eberhardt, Newark, N. J.

**WRENCHES, Adjustable S.—**
Keystone Mfg. Co., Buffalo, N. Y.

**WRENCHES, Adjustable S Pipe—**
Bemis & Call Hdw. & Tool Co., Springfield, Mass.
Keystone Mfg. Co., Buffalo, N. Y.

**WRENCHES, Bicycle and Pocket—**
Billings & Spencer Co., Hartford, Ct.
Bridgeport Gun Implement Co., 313 Broadway, N. Y.
Sam'l Hall's Sons, 229-233 W. 10th St., New York.
Hartford Hardware Co., Hartford, Ct.
C. E. Jennings Co., 101 Reade St., N. Y.
Frank Mossberg Co., Attleboro, Mass.
Peck, Stow & Wilcox Co., 27 Murray St., New York.
Smith & Egge Mfg. Co., Bridgeport, Ct.
Smith & Hemenway Co., 296 Broadway, New York.
Springfield Drop Forging Co., Springfield, Mass.
Star Mfg. Co., Carpentersville, Ill.
Tower & Lyon, 95 Chambers St., New York.
J. H. Williams & Co., Brooklyn, N. Y.

**WRENCHES, Brace—**
Braunsdorf-Mueller Co., Elizabeth, N. J.

**WRENCHES, Carriage—**
Goodell Co., Antrim, N. H.
Logan & Strobridge Iron Co., New Brighton, Pa.
Millers Falls Co., 28 Warren St., N. Y.
Tower & Lyon, 95 Chambers St., N. Y.

**WRENCHES, Chain—**
Trimont Mfg. Co., Roxbury, Mass.
J. H. Williams & Co., Brooklyn, N. Y.
Wm. W. Whitehead, Davenport, Ia.

**WRENCHES, Combination—**
Hartford Hardware Co., Hartford, Ct.

**WRENCHES, Drop Forged—**
Billings & Spencer Co., Hartford, Ct.
R. H. Brown & Co., New Haven, Ct.
Cincinnati Screw & Tap Co., Cincinnati, O.
Samuel Harris & Co., Chicago, Ill.
Indianapolis Drop Forging Co., Indianapolis, Ind.
Keystone Drop Forge Co., Philadelphia, Pa.
Wm. G. Le Count, So. Norwalk, Ct.
Rhode Island Tool Co., Providence, R. I.
Transue & Williams Co., Alliance, O.
W. W. Whitehead, Davenport, Ia.
D. Wilcox Mfg. Co., Mechanicsburg, Pa.
J. H. Williams & Co., Brooklyn, N. Y.

**WRENCHES, Malleable T—**
W. J. Clark Co., Salem, O.

**WRENCHES, Nipple—**
Bevin Bros. Mfg. Co., Easthampton, Ct.

**WRENCHES, Pipe—**
Armstrong Mfg. Co., Bridgeport, Ct.
Atlas Pipe Wrench Co., 121 Liberty St., New York.
Barnes Tool Co., New Haven, Ct.
Beiden Machine Co., New Haven, Ct.
Bemis & Call Hardware & Tool Co., Springfield, Mass.
Billings & Spencer Co., Hartford, Ct.
Crane Co., Chicago, Ill.
Hartford Hardware Co., Hartford, Ct.
Hollands Mfg. Co., Erie, Pa.
Iver Johnson's Arms & Cycle Works, Fitchburg, Mass.
Kilborn & Bishop Co., New Haven, Ct.
D. Saunders' Sons, Yonkers, N. Y.
Tower & Lyon, 95 Chambers St., New York.
Transue & Williams Co., Alliance, O.
Trimont Mfg. Co., Roxbury, Mass.
W. W. Whitehead, Davenport, Ia.
J. H. Williams & Co., Brooklyn, N. Y.
Wire Goods Co., Worcester, Mass.

**WRENCHES, Screw (Mechanics', Agricultural, &c.)—**
Bemis & Call Hardware & Tool Co., Springfield, Mass.
Billings & Spencer Co., Hartford, Ct.
Coes Wrench Co., Worcester, Mass.
Gould & Eberhardt, Newark, N. J.
Helwig Mfg. Co., St. Paul, Minn.
Indianapolis Drop Forging Co., Indianapolis, Ind.
Peck, Stow & Wilcox Co., 27 Murray St., New York.
Smith & Egge Mfg. Co., Bridgeport, Ct.
Springfield Drop Forging Co., Springfield, Mass.
Star Mfg. Co., Carpentersville, Ill.
Tower & Lyon, 95 Chambers St., New York.
Transue & Williams Co., Alliance, O.

**WRENCHES, Socket—**
Sam'l Harris & Co., Chicago, Ill.
Smith & Egge Mfg. Co., Bridgeport, Ct.
J. H. Williams & Co., Brooklyn, N. Y.

**WRENCHES, Tap—**
Braunsdorf-Mueller Co., Elizabeth, N. J.
Samuel Harris & Co., Chicago, Ill.
Sawyer Tool Co., Fitchburg, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

**WRENCHES, Tap and Reamer—**
Armstrong Mfg. Co., Bridgeport, Ct.
Billings & Spencer Co., Hartford, Ct.
Butterfield & Co., Derby Line, Vt.
S. W. Card Mfg. Co., Mansfield, Mass.
J. M. Carpenter Tap & Die Co., Pawtucket, R. I.
Morse Twist Drill & Machine Co., New Bedford, Mass.
Pratt & Whitney Co., Hartford, Ct.
Springfield Machine Screw Co., Springfield, Mass.
Standard Tool Co., Cleveland, O.
J. Stevens Arms & Tool Co., Chicopee Falls, Mass.
Wells Bros. & Co., Greenfield, Mass.
Wiley & Russell Mfg. Co., Greenfield, Mass.

**WRENCHES, Trap—**
Oneida Community, Niagara Falls, N. Y.

**WRINGERS, Clothes—**
Bluffton Mfg. Co., Bluffton, Ind.
North Bros. Mfg. Co., Philadelphia, Pa.

**WRINGERS, Mop and Buckets, Combined—**
Eagle Cooperage Works, Circleville, O.
Tucker & Dorsey Mfg. Co., Indianapolis, Ind.

**WRIST PIN TURNING MACHINES—**
Pedrick & Ayer Co., Philadelphia, Pa.

**WROUGHT IRON GOODS, HOOKS, STAPLES, &c.—**
McKinney Mfg. Co., Allegheny, Pa.
Ney Mfg. Co., Canton, O.
Stanley Works, New Britain, Ct.
W. & J. Tiebout, 118 Chambers St., N. Y.
Wheeling Hinge Co., Wheeling, W. Va.
Wire Goods Co., Worcester, Mass.

**WROUGHT IRON SPECIALTIES—**
Wheeling Hinge Co., Wheeling, W. Va.

**WROUGHT STEEL BUTTS, SINKS, &c.—See Sinks, Butts, &c.**

**WROUGHT WASHERS—See Washers, Wrought.**

**YACHT HARDWARE—**
W. & J. Tiebout, 118 Chambers St., N. Y.

**YACHTS, Kerosene Engine—**
Daimler Mfg. Co., Long Island City, N. Y.

**YARD MEASURE, Steel—**
Brown & Sharpe Mfg. Co., Hartford, Ct.

**YARNS, Spun and Tarred—**
Waterbury Rope Co., 69 South St., N. Y.

**YELLOW METAL NAILS—See Sheathing Nails, &c., Yellow Metal.**

**YOKES, Automatic, Spring, Wagon—**
Automatic Yoke Co., Indianapolis, Ind.

**YOKES, Neck, Trimmed—**
Covert's Saddlery Works Farmer, N. Y.
Imperial Bit & Snap Co., Racine, Wis.
Walter W. Woodruff & Sons Co., Mount Carmel, Ct.

**YOKES, Ox—**
Automatic Yoke Co., Indianapolis, Ind.
Iowa Farming Tool Co., Fort Madison, Ia.

**YOKES, Wagon—**
Automatic Yoke Co., Indianapolis, Ind.

**ZINC BATTERY PLATES—See Battery Plates, Rolled Zinc.**

**ZINC FOR LECLANCHE BATTERIES—**
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
W. R. Ostrander & Co., 22 Dey St., N. Y.

**ZINC IN OIL—**
Wm. Connors Paint Mfg. Co., Troy, N. Y.

**ZINC PLATES—**
E. Phillips & Sons, So. Hanover, Mass.

**ZINC, Sheet—**
Illinois Zinc Co., Peru, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
Merchant & Co., Philadelphia, Pa.

**ZINC TACKS, TUBING—See Tacks, Tubing.**

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